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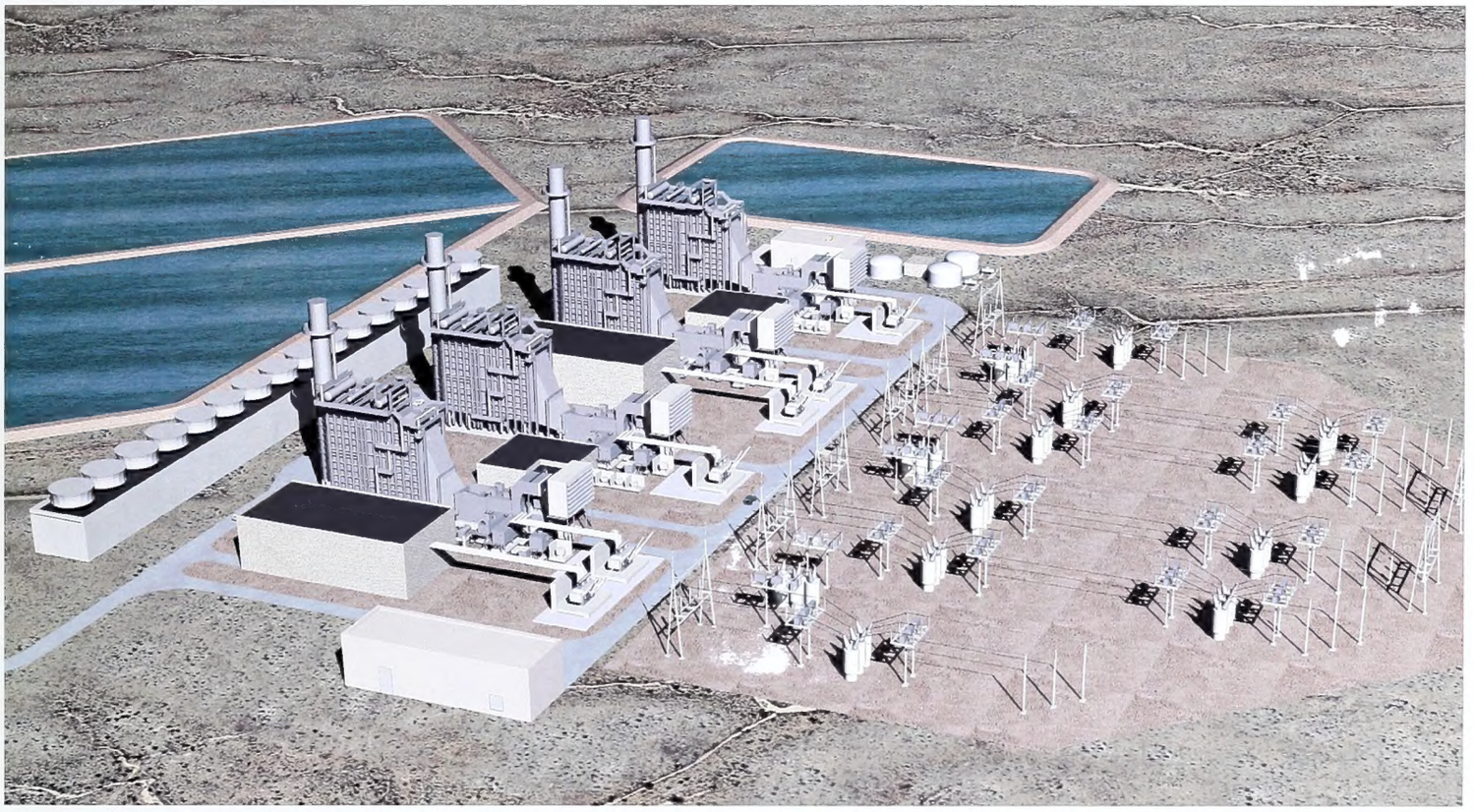
Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Final Environmental Impact Statement for the Toquop Energy Project



United States Department of Interior
Bureau of Land Management
FES 03-13

Nevada State Office, Nevada
March 2003

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Nevada State Office
P.O. Box 12000 (1340 Financial Blvd.)
Reno, Nevada 89520-0006
http://www.nv.blm.gov

In Reply Refer To:
2800/2200 (NV-040)
N-74943/N-74105

Dear Reader:

Enclosed for your information is the Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and Final Environmental Impact Statement (FEIS) for the Toquop Energy Project. This document evaluates the environmental effects that would result from constructing up to an 1,100-megawatt (MW) natural gas-fired electric power generating plant and associated features on public lands in Lincoln County and Clark County, southern Nevada, that are presently managed by the Ely and Las Vegas Field Offices of the U.S. Bureau of Land Management (BLM). The power plant site would be near the Toquop Wash, approximately 50 miles south-southeast of Caliente, Nevada, and 12 miles northwest of Mesquite, or alternatively, approximately 12 miles north-northwest of the Toquop Wash. This document also evaluates the effects of amending the Caliente MFP, which would identify specific sections of land as available for disposal. This document also evaluates the proposed exchange of approximately 640 acres of private land (the Pah Rah parcel) in Washoe County, northwestern Nevada, for a similarly valued parcel of public land. The Pah Rah parcel would come under BLM administration if the Pah Rah/Toquop land exchange is approved.

This Final Environmental Impact Statement contains in its entirety the analysis originally presented in the Draft Environmental Impact Statement with responses to public comments. The public comments have been responded to by supplementing, improving or modifying the analysis, making factual corrections or explaining why the comments do not warrant further agency response. This Final Environmental Impact Statement incorporates mitigation measures to minimize impacts to wildlife and other resources, as well as monitoring to review the effectiveness of the proposed mitigation.

The Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan may be protested by any person who participated in the planning process and who has an interest which is or may be adversely affected by the approval of the Proposed Plan Amendment. A protest may raise only those issues which were submitted for the record during the planning process (see 43 Code of Federal Regulations 1610.5-2). Protests filed electronically will not be accepted. File written protests by regular mail: U.S. Department of the Interior, Bureau of Land Management, Director (210), Attn: Ms. Brenda Williams, Protest Coordinator, P.O. Box 66538, Washington, DC 20035, or overnight mail: U.S. Department of the Interior, Director, Bureau of Land Management, Protest Coordinator (WO-210), 1620 L Street, NW., Room 1075, Washington, DC 20036.

All protests must be filed with the Director within 30 days from the date the Environmental Protection Agency publishes the NOA in the Federal Register. The protest must contain:

i. The name, mailing address, telephone number, and interest of the person filing the protest;

ii. A statement of the issue or issues being protested;

iii. A statement of the part, or parts, of the plan or amendment being protested;

iv. A copy of all documents addressing the issue, or issues, that were submitted during the planning process by the protesting party or an indication of the date the issue, or issues, were discussed for the record; and

v. A concise statement explaining why the State Director's decision is believed to be wrong.

If you have questions concerning the document, please contact Dan Netcher, Project Manager, at (775) 289-1872.

Sincerely,

Robert V. Abbey
State Director, Nevada

Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Final Environmental Impact Statement for the Toquop Energy Project

( ) Draft **(X) Final**

Lead Agency:	United States Department of the Interior Bureau of Land Management
Cooperating Agency:	United States Department of the Army Corps of Engineers, Sacramento District
Counties Directly Affected:	Lincoln, Clark, and Washoe Counties, Nevada
Environmental Impact Statement Contact:	Correspondence on this Final Environmental Impact Statement (Final EIS) should be directed to:

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Date draft plan amendment and Draft EIS filed with U.S. Environmental Protection Agency (EPA): May 31, 2002.

Date this final plan amendment and Final EIS made available to EPA and the public: APR 1 1 2003

Abstract

This Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and Final Environmental Impact Statement (EIS) for the Toquop Energy Project evaluates the environmental effects that would result from constructing the proposed Toquop Energy electric power generating plant. This maximum 1,100-megawatt (MW) natural gas-fired and water-cooled power plant and associated features would be located on public lands in Lincoln County and Clark County, southern Nevada, that are presently managed by the Ely and Las Vegas Field Offices of the U.S. Bureau of Land Management (BLM). The power plant site for the Proposed Action is approximately 50 miles south-southeast of Caliente, Nevada, and 12 miles northwest of Mesquite, Nevada. An alternative power plant site located in the Tule Desert approximately 12 miles north-northwest of the Toquop Wash plant site and an alternative air-cooled plant located at the Toquop Wash plant site are evaluated. This document responds to comments made during the public review period.

This document also evaluates the effects of amending the Caliente MFP, which would identify specific sections of land as available for disposal. This action would be needed to exchange approximately 640 acres of private land (the Pah Rah parcel) for a similarly valued parcel of public land at one of the power plant sites. The Pah Rah parcel is located in the Pah Rah Range in Washoe County in northwestern Nevada, and would come under BLM administration if the Pah Rah/Toquop land exchange is approved.

Federal actions addressed in the accompanying document are the BLM's issuance of rights-of-way needed to construct and operate the Toquop Energy Project, amendment of the Caliente MFP to identify specific public lands as available for disposal, and facilitation of a land exchange as it relates to the proposed project. This Final EIS satisfies the National Environmental Policy Act, which mandates that federal agencies analyze the environmental consequences of major undertakings.

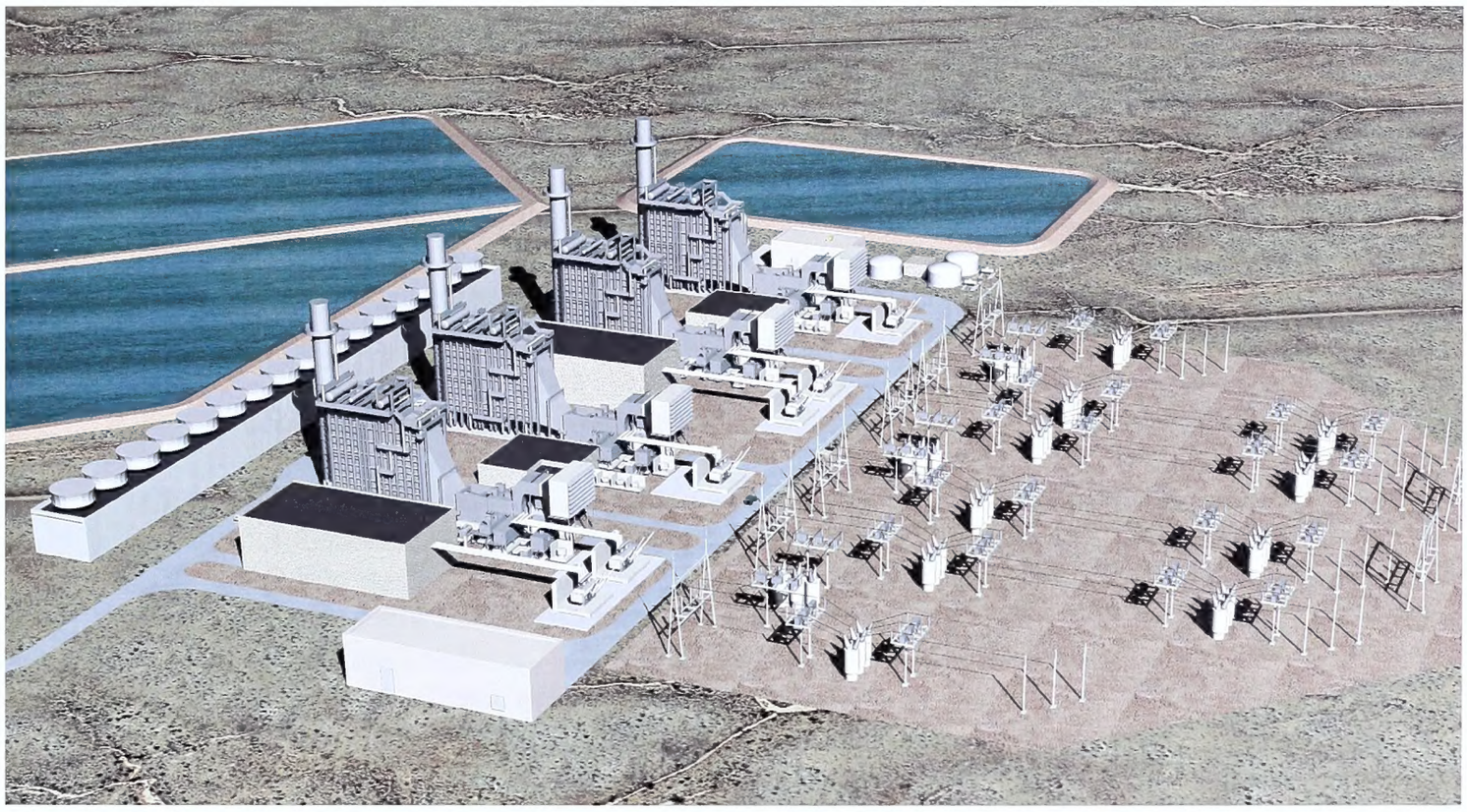
Official responsible for the plan amendment and the environmental impact statement:

Robert V. Abbey
State Director, Nevada

2-28-03
Date

#52163963 ID88066163 HD 243 .N3 C35 200

Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Final Environmental Impact Statement for the Toquop Energy Project



United States Department of Interior
Bureau of Land Management

Nevada State Office, Nevada
March 2003

Contents

Chapter **Page**

Letter to Reader

Abstract

ES.0 Executive Summary ES-1
ES.1 Introduction ES-1
ES.1.1 General Overview ES-1
ES.1.2 Purpose ES-1
ES.1.3 Need and Background ES-2
ES.2 Description of Proposed Action and Alternatives ES-5
ES.2.1 Proposed Action and Action Alternatives ES-5
ES.2.2 No Action Alternative ES-5
ES.2.3 Alternatives Considered During Scoping but Eliminated from Further Consideration ES-5
ES.2.4 Preferred Alternative ES-9
ES.3 Affected Environment and Environmental Consequences ES-10
ES.3.1 Proposed Action and Action Alternatives ES-10
ES.3.2 No Action Alternative ES-10
ES.4 Consultation and Coordination ES-11

Chapter 1.0 Introduction 1-1
1.1 General Overview 1-1
1.2 Purpose 1-1
1.3 Need and Background 1-2
1.4 Project Location 1-2
1.5 Policies, Plans, and Programs 1-7
1.5.1 Plan Conformance 1-7
1.5.2 Relationships to BLM Policies, Plans, and Programs 1-7
1.5.3 Relationships to Non-BLM Policies, Plans, and Programs 1-7
1.6 Management Framework Plan Amendment Process Overview 1-8
1.6.1 Identification of Issues 1-8
1.6.2 Development of Planning Criteria 1-8
1.6.3 Inventory and Data Evaluation 1-8
1.6.4 Analysis of the Existing Condition 1-9
1.6.5 Formulation of Alternatives 1-9
1.6.6 Estimation of the Effects of Alternatives 1-9
1.6.7 Selection of the Preferred Alternative 1-10
1.6.8 Selection of the Proposed Plan Amendment 1-10
1.6.9 Monitoring and Evaluation 1-10

Chapter **Page**

1.7 Applicable Laws and Regulations and Authorizing Actions and Permits 1-10
1.7.1 Applicable Laws and Regulations 1-10
1.7.2 Permits and Approvals 1-10
1.8 Interrelated Projects 1-10

Chapter 2.0 Description of Proposed Action and Alternatives 2-1
2.1 Introduction 2-1
2.2 Proposed Action 2-9
2.2.1 Description of BLM Actions 2-9
2.2.2 Description of Project Area, Power Plant Site, and Land Exchange .. 2-10
2.2.3 Description of Project Features and Operation 14
2.2.4 Construction Activities 2-26
2.2.5 Best Management Practices and Standard Operating Procedures 2-29
2.2.6 Decommissioning 2-29
2.3 Alternative 1 2-30
2.3.1 Description of BLM Actions 2-30
2.3.2 Description of Project Area, Land Disposal, and Power Plant Site 2-30
2.3.3 Description of Project Features and Operation 2-30
2.3.4 Construction Activities 2-31
2.3.5 Best Management Practices and Standard Operating Procedures 2-31
2.3.6 Decommissioning 2-31
2.4 Alternative 2 2-32
2.4.1 Description of BLM Actions 2-32
2.4.2 Description of Project Area, Land Disposal, and Power Plant Site 2-32
2.4.3 Description of Project Features and Operation 2-32
2.4.4 Construction Activities 2-36
2.4.5 Best Management Practices and Standard Operating Procedures 2-36
2.4.6 Decommissioning 2-36
2.5 Alternative 3 2-36
2.5.1 Description of BLM Actions 2-36
2.5.2 Description of Project Area, Land Disposal, and Power Plant Site 2-37
2.5.3 Description of Project Features and Operation 2-37
2.5.4 Construction Activities 2-43
2.5.5 Best Management Practices and Standard Operating Procedures 2-43
2.5.6 Decommissioning 2-44
2.6 No Action Alternative 2-44
2.7 Alternatives Considered During Scoping but Eliminated from Further Consideration 2-44
2.7.1 Alternative Generating Technologies 2-44
2.7.2 Alternative Locations 2-45
2.7.3 Alternative Access Road 2-46
2.8 Preferred Alternative 2-47

Chapter **Page**

Chapter 3.0 Affected Environment 3-1
3.1 Introduction 3-1
3.2 Soils and Geology 3-1
3.2.1 Soils 3-1
3.2.2 Geology 3-3
3.3 Surface Water Hydrology 3-12
3.3.1 Toquop Area 3-12
3.3.2 Pah Rah Parcel 3-21
3.4 Ground Water Resources 3-21
3.4.1 Regional Conditions 3-21
3.4.2 Local Conditions 3-25
3.4.3 Pah Rah Parcel 3-40
3.5 Biological Resources 3-40
3.5.1 Threatened, Endangered, Candidate, and Sensitive Species 3-40
3.5.2 Native Vegetation, Invasive Species, and Noxious Weeds 3-52
3.5.3 Wild Horses and Burros 3-54
3.5.4 Wildlife and Fisheries Resources 3-55
3.5.5 Wetlands/Riparian Zones, Floodplains, and Waters of the United States 3-57
3.6 Air Quality and Noise 3-58
3.6.1 Air Quality 3-58
3.6.2 Noise 3-61
3.7 Visual Resources 3-65
3.7.1 Toquop Area 3-66
3.7.2 Pah Rah Parcel 3-66
3.8 Recreation Resources 3-67
3.8.1 Toquop Area 3-67
3.8.2 Pah Rah Parcel 3-68
3.9 Land Use, Prime or Unique Farmlands, and Rangelands 3-68
3.9.1 Toquop Area 3-68
3.9.2 Pah Rah Parcel 3-78
3.10 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers 3-79
3.10.1 Toquop Area 3-79
3.10.2 Pah Rah Parcel 3-84
3.11 Wastes, Hazardous and Solid 3-91
3.11.1 Toquop Area 3-91
3.11.2 Pah Rah Parcel 3-92
3.12 Cultural and Historical Resources and Native American Religious Concerns 3-92
3.12.1 Toquop Area 3-92
3.12.2 Pah Rah Parcel 3-95
3.13 Indian Trust Assets 3-96
3.13.1 Toquop Area 3-96
3.13.2 Pah Rah Parcel 3-96

Chapter **Page**

3.14 Environmental Justice 3-96
3.14.1 Toquop Area 3-97
3.14.2 Pah Rah Parcel 3-97
3.15 Paleontological Resources 3-97
3.15.1 Toquop Area 3-97
3.15.2 Pah Rah Parcel 3-97
3.16 Socioeconomics 3-99
3.16.1 Toquop Area 3-99
3.16.2 Pah Rah Parcel 3-106
3.17 Transportation 3-108
3.17.1 Toquop Area 3-108
3.17.2 Pah Rah Parcel 3-109

Chapter 4.0 Environmental Consequences 4-1
4.1 Introduction 4-1
4.1.1 Assumptions and Assessment Guidelines 4-1
4.1.2 Incomplete and/or Unavailable Information 4-2
4.1.3 Option for BLM to Issue ROWs 4-2
4.2 Soils and Geology 4-2
4.2.1 Soils 4-3
4.2.2 Geology 4-4
4.3 Surface Water Hydrology 4-5
4.3.1 Proposed Action 4-5
4.3.2 Alternative 1 4-7
4.3.3 Alternative 2 4-7
4.3.4 Alternative 3 4-7
4.3.5 No Action Alternative 4-7
4.4 Ground Water Resources 4-8
4.4.1 Ground Water Resources—Incomplete and/or Unavailable Information 4-8
4.4.2 Proposed Action 4-14
4.4.3 Alternative 1 4-19
4.4.4 Alternative 2 4-20
4.4.5 Alternative 3 4-20
4.4.6 No Action Alternative 4-21
4.5 Biological Resources 4-21
4.5.1 Threatened, Endangered, and Sensitive Species 4-21
4.5.2 Vegetation and Noxious Weeds 4-25
4.5.3 Wild Horses and Burros 4-27
4.5.4 Wildlife and Fisheries Resources 4-27
4.5.5 Wetlands/Riparian Zones, Floodplains, and Waters of the United States 4-30
4.6 Air Quality and Noise 4-40
4.6.1 Air Quality 4-40
4.6.2 Noise 4-56

Chapter **Page**

4.7 Visual Resources 4-58
4.7.1 Proposed Action 4-58
4.7.2 Alternative 1 4-60
4.7.3 Alternative 2 4-60
4.7.4 Alternative 3 4-62
4.7.5 No Action Alternative 4-62
4.8 Recreation Resources 4-63
4.8.1 Proposed Action 4-63
4.8.2 Alternative 1 4-63
4.8.3 Alternative 2 4-63
4.8.4 Alternative 3 4-63
4.8.5 No Action Alternative 4-64
4.9 Land Use, Prime or Unique Farmlands, and Rangelands 4-64
4.9.1 Proposed Action 4-64
4.9.2 Alternative 1 4-65
4.9.3 Alternative 2 4-65
4.9.4 Alternative 3 4-66
4.9.5 No Action Alternative 4-66
4.10 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers 4-66
4.10.1 Proposed Action 4-66
4.10.2 Alternative 1 4-67
4.10.3 Alternative 2 4-68
4.10.4 Alternative 3 4-68
4.10.5 No Action Alternative 4-68
4.11 Wastes, Hazardous and Solid 4-68
4.11.1 Proposed Action 4-68
4.11.2 Alternative 1 4-68
4.11.3 Alternative 2 4-69
4.11.4 Alternative 3 4-69
4.11.5 No Action Alternative 4-69
4.12 Cultural and Historical Resources and Native American Religious Concerns 4-69
4.12.1 Proposed Action 4-69
4.12.2 Alternative 1 4-70
4.12.3 Alternative 2 4-71
4.12.4 Alternative 3 4-71
4.12.5 No Action Alternative 4-71
4.13 Indian Trust Assets 4-71
4.13.1 Proposed Action and Action Alternative 4-71
4.13.2 No Action Alternative 4-72
4.14 Environmental Justice 4-72
4.14.1 Proposed Action 4-72
4.14.2 Alternative 1 4-72
4.14.3 Alternative 2 4-72

Chapter **Page**

4.14.4 Alternative 3 4-73
4.14.5 No Action Alternative 4-73
4.15 Paleontological Resources 4-73
4.15.1 Proposed Action and Alternatives 4-73
4.15.2 No Action Alternative 4-73
4.16 Socioeconomics 4-73
4.16.1 Proposed Action 4-74
4.16.2 Alternative 1 4-82
4.16.3 Alternative 2 4-82
4.16.4 Alternative 3 4-84
4.16.5 Tax Receipts if No Land Disposal Were to Occur under the Proposed Action, Alternative 1, Alternative 2, or Alternative 3 4-87
4.16.6 No Action Alternative 4-88
4.17 Transportation 4-88
4.17.1 Proposed Action 4-88
4.17.2 Alternative 1 4-91
4.17.3 Alternative 2 4-91
4.17.4 Alternative 3 4-91
4.17.5 No Action Alternative 4-91
4.18 Cumulative Impacts 4-91
4.18.1 Introduction 4-91
4.18.2 Description of Interrelated Projects 4-92
4.18.3 Resources Not Cumulatively Impacted 4-97
4.18.4 Resources Analyzed in Detail for Potential Cumulative Impacts 4-97
4.19 Unavoidable Adverse Impacts 4-121
4.19.1 Soils and Geology 4-121
4.19.2 Surface Water Hydrology 4-121
4.19.3 Ground Water Resources 4-121
4.19.4 Biological Resources 4-121
4.19.5 Air Quality and Noise 4-122
4.19.6 Visual Resources 4-122
4.19.7 Recreation Resources 4-122
4.19.8 Land Use, Prime or Unique Farmlands, and Rangelands 4-122
4.19.9 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers 4-122
4.19.10 Wastes, Hazardous and Solid 4-122
4.19.11 Cultural and Historical Resources and Native American Religious Concerns 4-122
4.19.12 Indian Trust Assets 4-122
4.19.13 Environmental Justice 4-122
4.19.14 Paleontological Resources 4-122
4.19.15 Socioeconomics 4-122
4.19.16 Transportation 4-123

Chapter **Page**

4.20 Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity 4-123
4.20.1 Introduction 4-123
4.20.2 Short-Term Uses 4-123
4.20.3 Maintenance and Enhancement of Long-Term Productivity 4-124
4.21 Irreversible and Irretrievable Commitments of Resources 4-125
4.22 Energy Requirements and Conservation Potential 4-127
4.23 Monitoring 4-127
4.23.1 Toquop Land Disposal to the Caliente MFP Amendment 4-127
4.23.2 Ground Water 4-128
4.23.3 Evaporation Pond 4-128
4.23.4 Air Quality 4-128
4.23.5 Reclamation 4-129
4.23.6 Stormwater 4-129
4.23.7 Cultural Resources 4-129

Chapter 5.0 Consultation and Coordination 5-1
5.1 Introduction 5-1
5.2 Public Scoping 5-1
5.2.1 Public Scoping for the Pah Rah/Toquop Land Exchange 5-1
5.2.2 Public Scoping for the Toquop Energy Project 5-2
5.2.3 Public Scoping for the Toquop Land Disposal Amendment to the Caliente MFP/Toquop Energy Project 5-3
5.3 Coordination During MFP Amendment/Toquop Energy Project DEIS Development 5-4
5.3.1 General Consultation 5-4
5.3.2 Native American Consultation 5-4
5.4 Request for Comments on the Draft Caliente MFP Amendment/ Toquop Energy Project DEIS 5-7
5.4.1 Distribution 5-7
5.4.2 Availability 5-8
5.5 Request for comments on the Notice of Exchange Proposal ("NOEP") 5-9
5.5.1 Purpose 5-9
5.5.2 Distribution 5-10
5.6 Public Meetings 5-10
5.7 Coordination During MFP Amendment/Toquop Energy Project FEIS Development 5-10
5.7.1 Public Comments on the DEIS 5-11
5.8 List of Preparers and Reviewers 5-11

Chapter 6.0 References 6-1

Acronyms and Abbreviations ..... A&A-1

Chapter **Page**

Glossary **GL-1**

Index **I-1**

Appendixes

A Measures for Protecting Desert Tortoises and Their Habitat

B Standard Construction and Operation Procedures

C Cultural Resources Programmatic Agreement

D U.S. Fish and Wildlife Service Section 7 Consultation Letter: Species List for the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada

E Salinity Effects on Birds

F Section 404(b)1 Guidelines Assessment for the Toquop Energy Facility

G Air Quality Dispersion Modeling Methodology

H Bureau of Land Management Visual Contrast Rating Worksheet

I Employment and Labor Income Multiplier Analysis Assumptions

J Comments and Responses on the DEIS

Tables **Page**

ES-1 Summary Description of Proposed Action and Action Alternatives ES-6

ES-2 Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives ES-13

1-1 Planning Criteria for the Toquop Land Disposal Amendment to the Caliente MFP 1-9

1-2 Laws and Regulations that may Apply to the Proposed Action and Other Action Alternatives of the Toquop Energy Project 1-11

1-3 Federal, State, County, and Other Permits and Approvals that may be Needed to Implement the Proposed Action or Other Action Alternatives of the Toquop Energy Project 1-12

2-1 Land in Clark County and Lincoln County Affected by the Access Road 2-23

2-2 Time and Equipment Construction Requirements for the Proposed Action 2-27

2-3 Comparison of Alternative Fuels 2-46

Tables **Page**

3-1 Summary of Climatic Statistics in the Vicinity of the Project Area 3-12

3-2 Ground Water Levels in the Fractured-Rock Aquifer in the Tule Desert 3-28

3-3 Species of Concern that may Occur Within the Vicinity of the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada 3-47

3-4 Easements and Rights-of-Way in the Toquop Area 3-66

3-5 Archaeological Sites and Isolated Artifacts within 1 Mile of the Proposed Action and Alternatives 3-90

3-6 Archaeological Sites and Isolated Artifacts in the Pah Rah Parcel 3-92

3-7 Demographic Data for Clark and Lincoln Counties 3-94

3-8 1999 Clark County Total Full- and Part-Time Employment by Industry 3-96

3-9 1999 Lincoln County Total Full- and Part-Time Employment by Industry 3-97

3-10 1999 Clark County Place of Work Earnings by Industry 3-98

3-11 1999 Lincoln County Place of Work Earnings by Industry 3-99

3-12 1999 Washoe County Employment by Industry 3-102

3-13 1999 Washoe County Place of Work Earning by Industry 3-103

3-14 Existing and Estimated Average Daily Traffic Volumes on I-15 near the Project Area 3-105

4-1 Desert Tortoise Habitat Disturbed under the Proposed Action and Action Alternatives 4-22

4-2 Emissions During the Construction Phase—Short-Term Rates 4-40

4-3 Emissions During the Construction Phase—Total 4-41

4-4 Criteria Air Pollutant Potential Emissions for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3 4-43

4-5 Hazardous Air Pollutant Potential Emissions for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3 4-44

4-6 Estimated Reasonable but Conservative Impacts for Proposed Action Power Plant Construction 4-45

Tables **Page**

4-7 Estimated Reasonable but Conservative Impacts for Proposed Action Access Road Construction 4-45

4-8 Estimated Reasonable but Conservative Impacts for Proposed Action Water Pipeline Construction 4-46

4-9 Estimated Reasonable but Conservative Impacts for Proposed Action Well Site Construction 4-46

4-10 Estimated Reasonable but Conservative Impacts for the Proposed Action 4-48

4-11 Hazardous Pollutant Impact Analysis 4-49

4-12 Predicted Grand Canyon National Park Impacts for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3 4-50

4-13 Estimated Project Cost for the Proposed Action 4-72

4-14 Estimated Project Cost for Alternative 2 4-81

4-15 Estimated Project Cost for Alternative 3 4-83

4-16 Summary of Resource Area and Interrelated Project Analysis for Cumulative Impacts 4-96

4-17 Resource Utilization of Interrelated Projects 4-97

4-18 Regional Increment Consuming Sources 4-103

4-19 Increment Analysis for Predicted Cumulative Impacts for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3 4-106

4-20 NAAQS Regional Sources 4-107

4-21 NAAQS Analysis for Predicted Cumulative Impacts for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3 4-109

4-22 Irreversible and Irretrievable Commitments of Resources 4-122

5-1 Comment Letters on the Draft MFP Amendment/EIS 5-12

5-2 BLM EIS ID Team 5-14

5-3 EIS Core Team 5-14

5-4 Other Resources 5-15

5-5 EIS Consultant Team 5-16

Figures **Page**

2-1 Toquop Energy Project Water-Cooled Power Plant 2-17

2-2 Combined Cycle Electric Power Production Process 2-19

2-3 Toquop Energy Project Air-Cooled Power Plant 2-41

3-1 Representative Wind Rose for the Toquop Area 3-59

Maps **Page**

ES-1 Project Area ES-3

1-1 Project Area 1-3

1-2 Vicinity Map of the Pah Rah Parcel 1-5

1-3 Interrelated Projects 1-15

2-1 Toquop Energy Project, Proposed Action and Alternative 3 2-3

2-2 Toquop Energy Project, Alternative 1 2-5

2-3 Toquop Energy Project, Alternative 2 2-7

2-4 Toquop Energy Project, Proposed Plant Site, Proposed Action and Alternative 1 (Section 36) 2-11

2-5 Toquop Energy Project, Proposed Plant Site, Alternative 2 (Section 4) 2-33

2-6 Toquop Energy Project Proposed Plant Site Proposed Action and Alternative 3 (Dry Cooling) (Section 36) 2-39

3-1 Location and General Extent of the Basin and Range Province 3-5

3-2 General Geology in the Vicinity of the Project Area 3-7

3-3 Hydrographic Areas in the Vicinity of the Project Area 3-13

3-4 Surface Water Features in the Vicinity of the Project Area 3-17

3-5 Hydrographic Areas and Physical Features in the Vicinity of the Project Area 3-21

3-6 Springs in the Vicinity of the Project Area 3-33

3-7 Toquop Energy Project, Tortoise Habitat Areas, Proposed Action and Alternative 3 3-41

Maps **Page**

3-8 Toquop Energy Project, Tortoise Habitat Areas, Alternative 1 3-43

3-9 Toquop Energy Project, Tortoise Habitat Areas, Alternative 2 3-45

3-10 Toquop Energy Project, Grazing Allotments, Proposed Action and Alternative 3 3-69

3-11 Toquop Energy Project, Grazing Allotments, Alternative 1 3-71

3-12 Toquop Energy Project, Grazing Allotments, Alternative 2 3-73

3-13 Land Status in the Vicinity of the Pah Rah Property 3-77

3-14 Toquop Energy Project, Wilderness Study Areas and ACEC, Proposed Action and Alternative 3 3-81

3-15 Toquop Energy Project, Wilderness Study Areas and ACEC, Alternative 1 3-83

3-16 Toquop Energy Project, Wilderness Study Areas and ACEC, Alternative 2 3-85

4-1 Toquop Energy Project Approximate Locations of Waters of the United States (Proposed Plant Site) 4-31

4-2 Toquop Energy Project Approximate Locations of Waters of the United States (Access Road Improvements) 4-33

4-3 Toquop Energy Project Approximate Locations of Waters of the United States (Proposed Pipeline) 4-35

Executive Summary

ES.0 Executive Summary

The following sections summarize the *Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and the Final Environmental Impact Statement (FEIS)* for the proposed Toquop Energy Project. This summary provides a general overview of the project and its purpose and need; briefly describes the Proposed Action and other alternatives; summarizes major impacts for key resources associated with the Proposed Action, each action alternative, and the No Action Alternative; and lists key consultation and coordination activities.

ES.1 Introduction

ES.1.1 General Overview

The Proposed Action and alternatives for the Toquop Energy Project were developed in response to a proposal by Toquop Energy, Inc., (Toquop Energy) to construct and operate a 1,100-megawatt (MW) natural gas-fired water-cooled electric power generating plant in Lincoln County in southern Nevada. The plant and associated features (access road, utility corridors, and wellfield) in Lincoln County would be on public lands that are presently managed by the Ely Field Office of the U.S. Bureau of Land Management (BLM). A portion of the plant access road would be located on lands in Clark County that are presently managed by the Las Vegas Field Office of the BLM. The power plant site for the Proposed Action is near the Toquop Wash, approximately 50 miles south-southeast of Caliente, Nevada, and 12 miles northwest of Mesquite, Nevada. This site is referred to as the Toquop southern parcel. An alternative power plant site is approximately 12 miles north-northwest of the Toquop Wash plant site. This site is referred to as the Toquop northern parcel. The power plant would require connections to natural gas, electric transmission, water, and site access facilities, which would require rights-of-way (ROWs) from the BLM. The BLM would issue ROWs for a total of 42 years to cover the construction and expected operational life of the project.

This document evaluates three BLM actions and the potential environmental effects that would result from: 1) issuance of Rights-of-Way (ROWs) under the Federal Land Policy and Management Act (FLPMA) for the construction and operation of the electric power generating plant, access road, water pipeline, and wellfield; 2) evaluation of the effects of adopting the *Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan*, which would identify specific sections of public land as suitable for disposal; and 3) exchange of a federally managed parcel of public land where the plant would be located for a private parcel of land owned by the Nevada Land and Resource Company, LLC (NLRC). The private parcel is located in the Pah Rah Range in Washoe County in northwestern Nevada. Map ES-1 shows the project area for the Toquop Land Disposal Amendment to the Caliente MFP and the Toquop Energy Project.

ES.1.2 Purpose

The proposed plant would generate electrical power at competitive costs for use by consumers to ease the near- and

long-term shortages of power in the western United States. The proposed project would contribute to meeting the demand for power in the Western Systems Coordinating Council (WSCC) service area, including the Las Vegas area, and could also contribute to meeting the capacity and annual energy requirements for the remainder of the Arizona-New Mexico-southern Nevada power area.

The project would provide economic benefits to Lincoln County, Nevada, which will provide opportunities for an increased tax base and increased employment opportunities.

Responding to a request for a land exchange, the project would provide the BLM with a mechanism for acquiring a desirable parcel of private land in the Pah Rah Range in northwestern Nevada and would facilitate public land management by the BLM by creating contiguous tracts of land.

ES.1.3 Need and Background

The WSCC estimates a demand for approximately 11,300 MW of new power plant generation to be constructed in its region of the western United States over the next 10 years to maintain reliable operation of the transmission system. The Toquop project would provide much needed support to the overall energy supply in this region and contribute approximately 10 percent of the projected demand for new generation within the WSCC. Based on data available from the WSCC, the 2002 Operating Reserve Margin (the difference between available capacity, excluding transfers, and peak demand) for the Las Vegas area and the Arizona-New Mexico-southern Nevada area is minus 2.9 percent. This indicates that the area relies on importing electricity to meet peak demands. This situation is the result of growth in the demand for electricity to serve a fast growing region. The proposed project would significantly strengthen the electric grid in the Las Vegas area, including the City of Mesquite, based on the flow of electric power on the existing transmission system.

Needed and desired economic benefits would result from the construction and operation of the power plant. Lincoln County is approximately 98 percent public land with limited industrial and commercial development. Lincoln County ranks near the bottom among Nevada's counties in population, total personal and per capita income and tax revenues. Development of the proposed power plant and associated linear facilities would provide important increases to the Lincoln County tax base through sales, use, and property taxes on the power plant improvements. The construction and operation of the power plant would have positive effects on employment opportunities and result in increased revenue from project-related purchases of goods and services.

The land exchange would be between NLRC and BLM's Carson City Field Office. NLRC owns over 1.2 million acres of land in northern Nevada, lying in a checkerboard pattern interspersed with other privately owned and federally managed public lands. Much of the NLRC land has many resources desirable to the BLM (such as sage grouse habitat) and is identified for acquisition in BLM land use plans. Since certain disposable BLM-managed lands are desirable for economic development by NLRC, this land exchange would benefit both parties and the general public.

H:\projects\toquop-EIS\Revised_Figures-1-27-2003\Report-figs.apr (Map 1-1_layout)
R67E
R68E
R69E
R70E
R71E
T8S
T9S
T8 1/2S
T10S
T10 1/2S
T11S
T12S
T13S
UTAH
NEVADA
ARIZONA
Alternative Power Plant Site
Desert
Tule
Wash
Garden
Jumbled Mtn.
Hills
Springs
Toquop Gap
Toquop Wash
Mormon Mountains
Mormon
East
Existing Electrical Transmission Line
Proposed Power Plant Site
Existing Natural Gas Line and Electrical Transmission Lines
LINCOLN COUNTY
CLARK COUNTY
Mesa
Top
Flat
Halfway
Wash
Mesquite
Virgin River
15
Pah Rah Parcel
Toquop Parcels
Area Locations
N
0
6250
12500
18750 Feet
Source:
1:100,000 Vector Linework - BLM Nevada,
Project Area
Map ES-1
CH2MHILL

ES.2 Description of Proposed Action and Alternatives

ES.2.1 Proposed Action and Action Alternatives

The Proposed Action and three other action alternatives were developed for the Toquop Land Disposal Amendment to the Caliente MFP and Toquop Energy Project. They include the following:

- **Proposed Action.** Water-cooled power plant, western utility alignment ROW, wellfield ROW, access road ROW, southern power plant site ROW, Proposed Toquop Land Disposal Amendment to the Caliente MFP, and/or Toquop/Pah Rah land exchange (southern parcel).

- **Alternative 1.** Water-cooled power plant, eastern utility alignment ROW, southern power plant site ROW, wellfield ROW, access road ROW, Proposed Toquop Land Disposal Amendment to the Caliente MFP, Toquop land disposal (southern parcel) through sale or exchange.

- **Alternative 2.** Water-cooled power plant, eastern utility alignment ROW, northern power plant site ROW, wellfield ROW, access road ROW, Proposed Toquop Land Disposal Amendment to the Caliente MFP, Toquop land disposal (northern parcel) through sale or exchange.

- **Alternative 3.** Air-cooled power plant, western utility alignment ROW, southern power plant site ROW, wellfield ROW, access road ROW, Proposed Toquop Land Disposal Amendment to the Caliente MFP, Toquop land disposal (southern parcel) through sale or exchange.

Table ES-1 summarizes the specific elements of the Proposed Action, Alternative 1, Alternative 2, and Alternative 3. These elements include BLM actions, project facilities and features, and Best Management Practices (BMPs) and Standard Operating Procedures (SOPs) that would be implemented as an integral part of the Proposed Action and action alternatives. An option to the Proposed Action and action alternatives that is evaluated in this document would be for the BLM to issue ROWs for all project facilities, including the power plant site.

ES.2.2 No Action Alternative

Under the No Action Alternative, the Caliente MFP would not be amended, the Pah Rah/Toquop land exchange would not occur, project-related ROWs would not be created, and the power plant and related facilities would not be built or operated as described for the Proposed Action, Alternative 1, Alternative 2, or Alternative 3.

ES.2.3 Alternatives Considered During Scoping but Eliminated from Further Consideration

Alternative fuels, project locations, and access roads were considered during project scoping but eliminated from detailed analyses, because they failed to meet project purpose and need, were operationally infeasible, were economically infeasible, and/or were environmentally unacceptable. Alternative fuels were eliminated because they would not be as efficient as using natural gas to generate electrical power at competitive

TABLE ES-1
Summary Description of Proposed Action and Action Alternatives

Project Element	Alternative			
	Proposed Action	**Alternative 1**	**Alternative 2**	**Alternative 3**
	BLM Actions			
ROWs	All Alternatives—Issue ROWs by the BLM for constructing and operating the power plant and all related facilities			
Caliente MFP Amendment	All Alternatives—Amend the Caliente MFP to identify the site as suitable for disposal.			
Toquop Land Disposal	Complete a land exchange. Exchange publicly owned Section 36, T11S, R69E in Lincoln County for privately owned Section 9, T20N, R23E in Washoe County	Toquop land disposal (southern parcel) through sale or exchange	Toquop land disposal (northern parcel) through sale or exchange	Toquop land disposal (southern parcel) through sale or exchange
	Power Plant Facilities			
Power plant construction	Construct and operate a 1,100-MW (maximum) combined cycle, natural gas-fired water-cooled electric generating plant			Construct and operate a 1,100-MW maximum combined cycle, natural gas-fired air-cooled electric generating plant
Power plant location	Section 36, T11S, R69E in Lincoln County (southern power plant site)		Section 4, T10S, R69E in Lincoln County adjacent to the Tule Desert wellfield (northern power plant site)	Section 36, T11S, R69E in Lincoln County (southern power plant site)
Electric distribution and transmission lines	Construct and operate buried electric distribution power lines from the power plant to the well pumps and overhead transmission lines from the plant to the Navajo-McCullough Electric Transmission Line and the adjacent Red-Butte Harry Allen line.			
	1,300-foot transmission lines. Distribution line to the wellfield along the 12.5-mile-long western water pipeline ROW	1,300-foot transmission lines. Distribution line to the wellfield along the 12.6-mile-long eastern water pipeline ROW	12.0-mile-long line from the northern plant site along the eastern utility corridor ROW. Short distribution line to the wellfield	1,300-foot transmission lines. Distribution line to the wellfield along the 12.5-mile-long western water pipeline ROW

TABLE ES-1
Summary Description of Proposed Action and Action Alternatives

Project Element	Alternative			
	Proposed Action	**Alternative 1**	**Alternative 2**	**Alternative 3**
Gas pipeline	2,400-foot, 20-inch pipeline from the Kern River Gas Pipeline to the southern power plant		12.0-mile-long, 20-inch pipeline from the Kern River Gas Pipeline along the eastern utility corridor ROW to the northern power plant	2,400-foot, 20-inch pipeline from the Kern River Gas Pipeline to the southern power plant
Road Access and Transportation				
Access road to power plant	Paving to a width of 24 feet and straightening sections of approximately 14.4 miles of an existing dirt and gravel road to produce an access road extending from I-15 to the southern plant		Paving to a width of 24 feet and straightening sections of approximately 26.6 miles of an existing dirt and gravel road from I-15 to the northern plant	Paving to a width of 24 feet and straightening sections of approximately 14.4 miles of an existing dirt and gravel road to produce an access road extending from I-15 to the southern plant
Access ROW to wellfield	Provide a 12.5-mile-long access ROW between the southern power plant and the ground water wellfield along an existing dirt and gravel road	Provide a 12.6-mile-long access ROW between the southern power plant and the ground water wellfield along an existing dirt and gravel road	Northern power plant is near the wellfield	Provide a 12.5-mile-long access ROW between the southern power plant and the ground water wellfield along an existing dirt and gravel road
Ground Water Wellfield				
Wellfield	Drill up to 15 wells over the life of the project in the Tule Desert Basin sufficient to produce an annual average flow of 3,800 gallons per minute (gpm) (7,100 gpm peak daily) of water for the power plant, which will use up to 7,000 acre-feet per year			Drill up to 3 wells over the life of the project in the Tule Desert Basin sufficient to produce an annual average flow of 100 gallons per minute (gpm) (200 gpm peak daily) of water for the power plant, which will use up to 170 acre-feet per year
	Construct and operate a manifold collection system to interconnect the water output from the wellfield to a pressure-regulating water tank			
Water tank	Construct and operate a pressure-regulating water tank located near the wellfield before the water pipeline to the power plant			

TABLE ES-1
Summary Description of Proposed Action and Action Alternatives

Project Element	Alternative			
	Proposed Action	**Alternative 1**	**Alternative 2**	**Alternative 3**
	Water Pipeline			
Water pipeline	Construct and operate a 24-inch-diameter buried water pipeline extending from the wellfield to the power plant			Construct and operate a 4-inch-diameter buried water pipeline extending from the wellfield to the power plant
	12.5-mile-long western pipeline alignment through Toquop Gap.	12.6-mile-long eastern pipeline alignment	Power plant is near the wellfield	12.5-mile-long western pipeline alignment through Toquop Gap.
	Best Management Practices and Standard Operating Procedures (apply to all alternatives)			
ROWs	Comply with the terms and conditions of all ROWs issued by the BLM.			
Desert tortoise	Protect desert tortoise and their habitat by following management prescriptions during project construction, operation, and maintenance activities that are consistent with the Desert Tortoise Recovery Plan, relevant Habitat Conservation Plans, and other management documents.			
BMPs and SOPs	Follow best management practices (BMPs) and standard operating procedures (SOPs) typically associated with the construction, operation, and maintenance of power plants, wellfields, pipelines, other utility corridors, and related facilities in this region of the western United States to avoid or minimize the potential for adverse environmental effects resulting from project-related activities			
Cultural resources	Comply with stipulations of the *Cultural Resources Programmatic Agreement* (Appendix C) to ensure that historic and prehistoric properties will be treated to avoid or mitigate project-related effects to the extent practical and to satisfy BLM responsibilities.			

costs. In addition, the effects of using some alternative fuels would make them less environmentally attractive than using natural gas.

Alternative project locations were eliminated because they would present unacceptable environmental impacts, increased costs for fuel delivery and transmission line access, and a lack of economic benefits to communities within and near Lincoln County. In contrast, the selected project location would provide benefits to Toquop Energy and consumers through the cost-effective generation and sale of electricity to help meet power demands, and to Lincoln County through increased economic benefits from project development.

Alternative access roads were eliminated because of policy and environmental constraints. An existing access road that would be improved is available from I-15 to the proposed power plant site. This road is located predominantly within the Mormon Mesa Area of Critical Environmental Concern (ACEC). Both the Caliente MFP, which covers the Lincoln County portion of the existing access road, and the Las Vegas Resource Management Plan (RMP), which covers the Clark County portion of the existing access road, allow the upgrade of an existing road within an ACEC, provided that all resource constraints in the MFP and RMP are enforced. Constructing a new road in an ACEC is not allowed under the MFP or RMP where a feasible alternative exists (in this instance, improving the existing access road). Further, any newly constructed or improved existing access road that avoids the Mormon Mesa ACEC and provides access from the City of Mesquite and I-15 to the power plant sites would be substantially longer than the improved, existing access road and would impact desert bighorn sheep habitat.

ES.2.4 Preferred Alternative

BLM's Preferred Alternative is the Proposed Action which includes:

- Issue ROW for southern power plant site (Section 36)
- Issue ROW for western utility alignment
- Issue ROW for wellfield
- Issue ROW for access road between I-15 and the southern plant site
- *Proposed Toquop Land Disposal Amendment to the Caliente MFP*— Section 36 (southern parcel) suitable for disposal
- Toquop (Section 36)/Pah Rah (Washoe County) land exchange
- Construction and operation of a up to 1,100-MW natural gas-fired water-cooled power plant and ancillary facilities
- Comply with other requirements:
  - *Measures for Protecting Desert Tortoises and their Habitat (Appendix A)*
  - *Standard Construction and Operation Procedures (Appendix B)*
  - *Cultural Resources Programmatic Agreement (Appendix C)*

ES.3 Affected Environment and Environmental Consequences

ES.3.1 Proposed Action and Action Alternatives

Table ES-2, at the end of this chapter, summarizes major impacts anticipated under the Proposed Action and each action alternative by resource area as well as BMPs, SOPs, and mitigation measures that would be implemented. These measures are designed to avoid or prevent the occurrence of impacts and, where possible, to minimize the magnitude, extent, and duration of those impacts when their occurrence can not be prevented. BMPs, SOPs, and mitigation measures are referenced in Table ES-2. Briefly, they include complying with terms and conditions of ROWs issued by BLM; implementing SOPs and BMPs during project construction, operation, and maintenance that cover a broad range of resource areas and activities; following management prescriptions for protecting desert tortoises and their habitat; and complying with stipulations of the *Cultural Resources Programmatic Agreement.* Table ES-2 also notes any cumulative impacts anticipated from the combined effects of the proposed project and other reasonably foreseeable projects.

Unavoidable adverse impacts on resources are those residual impacts remaining after implementation of mitigation measures. These impacts would primarily be associated with lands that would be disturbed and/or included in construction ROWs. Lands disturbed during construction would total 449 acres under the Proposed Action, 451 acres under Alternative 1, 581 acres under Alternative 2, and 417 acres under Alternative 3. Following reclamation, net new long-term impacts would total 182 acres under the Proposed Action and Alternative 1, 237 acres under Alternative 2, and 150 acres under Alternative 3. Affected resources would include soils and biological soil crusts; several threatened, sensitive, and/or protected species such as desert tortoise; plant species and vegetative cover; some wildlife species and their habitat; and the Mormon Mesa Area of Critical Environmental Concern (ACEC). Use of ground water from the Tule desert wellfield also would represent an unavoidable adverse impact. Another possible unavoidable adverse impact would be the accidental disturbance of cultural resources if inadvertently encountered during construction. Implementation of all BMPs, SOPs, and mitigation measures listed and/or referenced in Table ES-2 would serve to reduce the extent, magnitude, and duration of these unavoidable adverse impacts in the same way that other potential impacts would be prevented from occurring.

Construction of the proposed project would result in the irreversible and irretrievable commitments of some resources. Irreversible impacts would include labor, capital, some construction materials, fuels, and ground water. Irretrievable impacts on environmental resources would generally not extend past the life of the project. Affected resources would include biological resources, air quality and noise, visual and recreation resources, land use for livestock, the Mormon Mesa ACEC, possibly cultural resources, and socioeconomics.

ES.3.2 No Action Alternative

No project-related impacts would occur under the No Action Alternative, and the affected environment (existing conditions)

in the Toquop area and on the Pah Rah parcel would be the same as at present. However, the No Action alternative would not meet any of the purposes and needs identified for the proposed project.

ES.4 Consultation and Coordination

Public scoping for the Draft Toquop Land Disposal Amendment to the Caliente MFP/ Toquop Energy Project DEIS was comprised of three separate scoping efforts:

- Scoping for the Pah Rah/Toquop Land Exchange—including public meetings conducted by the BLM during July 2001 in Mesquite and Reno
- Public meetings and scoping for the Toquop Energy Project—including public meetings conducted by the BLM during July 2001 in Caliente and Mesquite, and a scoping meeting in Las Vegas in August 2001
- Scoping for the combined Toquop Energy Project and Pah Rah/Toquop Land Exchange EIS, requiring an amendment to the Caliente MFP—conducted by BLM during November and December 2001

Most individuals who commented at the first set of scoping meetings opposed the land exchange. Those that did not state a position had questions about particular potential impacts, including wildlife habitat, cultural and historical resources, economic values, water development, visual and recreation resources, validity of the land exchange, and the NEPA process.

The Notice of Intent (NOI) to prepare the EIS on the Toquop Energy Project (the second set of public meetings) was published in the *Federal Register* on July 22, 2001. Three individuals favored the project, indicating the site would not have serious environmental consequences. However, many individuals were concerned about potential impacts that should be addressed in the DEIS, including water development, use, and ground water impacts; wildlife habitat and soils; air quality and noise; economics and land exchange values; and comprehensive plans, cumulative effects, and the NEPA process. Many attending the public meetings were concerned that if an out-of-state company were selected to construct the Toquop Energy facility, the chosen firm would bring in out-of-state workers to build the plant.

In reviewing comments received during the first two scoping processes, the BLM determined that combining the two NEPA processes had merit. It was also determined that the Pah Rah/Toquop Land Exchange required an amendment to the Caliente Management Framework Plan. Consequently, the decision was made to combine these actions into a single EIS and to reopen the scoping process for the expanded project.

The NOI to prepare an amendment to the Caliente MFP and an EIS for the Toquop Land Disposal Amendment to the Caliente MFP/Toquop Energy Project was published in the *Federal Register* on November 7, 2001. The public comment period closed on December 7, 2001. Because the previous two scoping processes included public meetings, the BLM determined that further public scoping meetings were duplicative and unnecessary for the expanded EIS. Written comments received from the public suggested an air-cooled plant as an alternative; ground water withdrawal effects; air quality, cultural resources, and natural resources impacts; land exchange values and statutes; and NEPA compliance.

Numerous federal, state, and local governmental agencies and Indian Tribes were consulted during the preparation of this EIS. Native American consultation occurred initially in relation to the land exchange proposal, now an alternative component of the Toquop Energy Project. Consultation with American Indian tribes also was initiated specifically in regard to the Toquop Energy Project itself. Some Indian Tribes have indicated to BLM that they have no concern about the Proposed Action and its alternatives. For other Indian Tribes, BLM has requested, but not received, sufficient information to establish whether project-related issues exist for Native Americans, including any issues related to the location and use of the Salt Song Trail. Concerns have been expressed for the preservation of all archaeological sites.

The public comment period opened with the announcement of the availability of the Draft MFP Amendment/Toquop Energy Project EIS in the *Federal Register* on May 31, 2002. Public comments on the Draft MFP Amendment/EIS were accepted until August 29, 2002.

The DEIS was sent to, and comments requested from, the general public and entities including federal, state, and local governments; Tribal governments; other organizations; and Members of Congress. The document was available at numerous libraries.

BLM must publish a Notice of Exchange Proposal (NOEP) upon entering into an Agreement to Initiate an Exchange ("ATI") with a land exchange proponent. BLM signed an ATI with NLRC on April 22, 2002 for this proposed land exchange. This document was published weekly for 4 consecutive weeks in local newspapers serving the Mesquite area, and both Lincoln and Washoe County, Nevada. In addition, this document was sent to, and comments requested from the members of the public and other individuals who attended public meetings, and to entities including federal, state, and local governments; Tribal governments; other organizations; and Members of Congress.

A series of four public meetings were held to receive comments on the DEIS. Dates and locations of these meetings were as follows:

Date	Location
July 8, 2002	Caliente, Nevada
July 9, 2002	Las Vegas, Nevada
July 10, 2002	Mesquite, Nevada
July 11, 2002	Reno, Nevada

The BLM received 159 separate pieces of correspondence containing comments on the DEIS during the comment period. Comments were received from three federal agencies, four state agencies, two local agencies, three interest groups, and 147 citizens. In addition, the BLM received five letters on the NOEP for the land exchange, and those letters were considered in the preparation of this FEIS. Responses were prepared for comments that presented new data, raised new issues, or disagreed with the impact conclusions. Where appropriate, changes or additions were made in the FEIS to respond to comments. A noteworthy outcome of this coordination and consultation process and of public comments on the DEIS is the presentation and analysis of an additional action alternative (Alternative 3) in this FEIS. Alternative 3 is an air-cooled, rather than a water-cooled, power plant.

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
3.2.1 and 4.2.1—Soils					
Toquop Area	449 acres initially disturbed and/or in construction ROWs. 267 acres would be reclaimed and 182 acres used for project features.	451 acres initially disturbed and/or in construction ROWs. 269 acres would be reclaimed and 182 acres used for project features.	581 acres initially disturbed and/or in construction ROWs. 344 acres would be reclaimed and 237 acres used for project features.	417 acres initially disturbed and/or in construction ROWs. 267 acres would be reclaimed and 150 acres used for project features.	Project is designed to minimize surface disturbance. Implement BMPs and SOPs for erosion control, dust suppression, site stabilization and reclamation, and place signs to discourage OHV use Implement stormwater management plan to prevent runoff, erosion, and sedimentation (see Surface Water Hydrology below)
	Disturbance and some loss of biological soil crusts at plant site and along pipeline alignment		Disturbance and some loss of biological soil crusts along pipeline alignment and possibly at plant site	Disturbance and some loss of biological soil crusts at plant site and along pipeline alignment	
	Temporary increase in erosion and wind-blown dust, potential localized increase in runoff and erosion, and possibly increased off-highway vehicle (OHV) use along improved access road				
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None
3.2.2 and 4.2.2—Geology					
Toquop Area	None	None	None	None	None
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
3.3 and 4.3—Surface Water Hydrology					
Toquop Area	Potentially degraded surface water quality from increased concentrations of suspended solids (sediment from disturbed soils) and dissolved constituents (such as petroleum hydrocarbons and metals from parking areas)				Implement stormwater management systems and plans per National Pollutant Discharge Elimination System (NPDES) stormwater permits Construct stormwater retention basin at plant site sized for 100-year event Implement BMPs and SOPs for erosion, sedimentation, and stabilization control, sediment detention basins, stormwater conveyance, and monitoring plan effectiveness Divert and redirect flows from filled wash at southern plant site to minimize erosion of adjacent washes Schedule construction activities in washes when probability for flash flooding is minimal
	Increased runoff from impervious surfaces at plant site and potential for flash flooding in washes				
	Increased flows in washes adjacent to the filled wash at power plant on the southern site			Increased flows in washes adjacent to the filled wash at power plant on the southern site	
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
3.4 and 4.4—Ground Water Resources					
Toquop Area	Ground water levels in the fractured-rock aquifer in the Tule Desert would only be lowered as a result of project pumping in the immediate vicinity (within a distance of approximately 1,000 feet) of the production wells. The effects described above would be restricted to the Tule Desert hydrographic area. There would be no substantial lowering of the water levels across the Tule Desert on the whole, nor would there be a substantial depletion of the ground water resource in the Tule Desert. This conclusion applies to both the fractured-rock aquifer as well as to ground water in the basin-fill deposits within the Tule Desert. Outside of the Tule Desert, ground water levels will not be lowered in either the fractured-rock aquifer or the basin-fill sediments.			Under Alternative 3, the demand for ground water (170 afy) would be considerably less than under the Proposed Action or either Alternative 1 or 2 (up to 7,000 afy). Therefore, inasmuch as there are no significant impacts to ground water levels, spring discharge, ground water quality, flow in the Virgin River, or land subsidence under the Proposed Action, Alternative 1, or Alternative 2, the impacts under Alternative 3 would similarly be minor.	Ground water levels in both the fractured rocks and the basin fill within the Tule Desert downgradient of the wellfield will be monitored and assessed. Ground water quality in the Tule Desert will be monitored and assessed. Pumped ground water will be monitored periodically to ensure its quality is suitable for power plant operation. The potential for contaminant releases that could affect resources will be minimized by adherence to regulatory requirements on hazardous substances (see Hazardous and Solid Wastes below).

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
Ground Water Resources (continued)	No adverse effects on ground water resources would occur as a result of the Proposed Action, Alternative 1, Alternative 2, or Alternative 3. Primary conclusions are as follows: • No lowering of ground water levels in existing wells would occur • No regional depletion of ground water resources would occur • No decrease in the discharge from local springs would occur • No degradation of ground water quality would occur • No decrease in the flow of the Virgin River would occur as a result of the project In addition, the potential for land subsidence and a corresponding loss of storage in either the fractured-rock aquifer or the basin-fill deposits is negligible. The temporary handling and storage of chemical substances and waste products would have a slight potential to affect ground water quality if there were an accidental release of these substances to the environment.				
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
3.5.1 and 4.5.1—Threatened, Endangered, and Sensitive Species					
Toquop Area	Construction disturbance of 449 acres of desert tortoise habitat (habitat for 8 tortoises). Net new long-term disturbance of 182 acres (habitat for 3 tortoises).	Construction disturbance of 451 acres of desert tortoise habitat (habitat for 8 tortoises). Net new long-term disturbance of 182 acres (habitat for 3 tortoises).	Construction disturbance of 581 acres of desert tortoise habitat (habitat for 10 tortoises). Net new long-term disturbance of 237 acres (habitat for 4 tortoises).	Construction disturbance of 417 acres of desert tortoise habitat (habitat for 7 tortoises). Net new long-term disturbance of 150 acres (habitat for 3 tortoises).	BMPs, SOPs, and mitigation measures to protect desert tortoise and their habitat include the Terms and Conditions to implement Reasonable and Prudent Measures Numbers 5, 6, and 7 in the U.S. Fish and Wildlife Service's *Biological Opinion for the Caliente Management Framework Plan Amendment.* Measures also include SOPs issued by BLM to aid in the recovery of the desert tortoise. Categories of BMPs, SOPs, and mitigation include the following: • Tortoise protection measures • Education by qualified biologist • Flagging of disturbed areas • Tortoise location and removal by qualified biologist • Speed limits • Signage • Trash and litter control • Spill handling procedures • Construction methods • Habitat remuneration See Appendix A for detail on desert tortoise BMPs, SOPs, and mitigation measures.
	Construction disturbance of 222 acres of desert tortoise critical habitat in the Mormon Mesa Area of Critical Environmental Concern (ACEC), consisting of 143 acres in Lincoln County managed by the BLM Ely Field Office and 79 acres in Clark County managed by the BLM Las Vegas Field Office. Following reclamation, the net new long-term disturbance would be 65 acres (42 acres in Lincoln County, 23 acres in Clark County). For Alternative 2 only, additional construction disturbance of approximately 44 acres and long-term disturbance of 12 acres of desert tortoise critical habitat in Lincoln County outside the Mormon Mesa ACEC.				
	Direct and indirect impacts on tortoises resulting in their take and/or harassment from ground-disturbing construction activities; increased human activities during project construction, operation, and maintenance; and increased public access.				
	Potential for impacting other special status species or habitats including birds during breeding season, burrowing owls, bat roosts (if encountered), Gila monsters, and chuckwallas.				

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
					Implement BMPs and SOPs for other special status species and/or their habitats, including bird nesting, breeding, and fledging; burrowing owl burrows and nesting cavities; trapping and relocating Gila monsters and chuckwallas; and avoiding bat roosts (if encountered).
Pah Rah Parcel	Management of important wildlife habitat, particularly for sage grouse, would be enhanced under BLM administration				None
Cumulative Effects	Impacts of non-federal actions, projects, and activities on the desert tortoise continue to occur throughout the range of the species. Off-highway vehicle use, shooting, and collecting of individuals continue to impact tortoise populations. The combined area of impact of nine interrelated projects, which include five other power projects, three land development projects, and one natural gas pipeline project, analyzed in the cumulative effects assessment would disturb a total of approximately 69,900 acres of desert tortoise habitat in southern Nevada. Types of direct and indirect impacts would be the same as described for the Toquop Energy Project.				Each project has specific mitigation measures for the protection of desert tortoise and their habitat.
3.5.2 and 4.5.2—Vegetation and Noxious Weeds					
Toquop Area	Construction disturbance and/or loss of 449 acres of habitat and vegetative cover. Net new long-term disturbance following reclamation of 182 acres.	Construction disturbance and/or loss of 451 acres of habitat and vegetative cover. Net new long-term disturbance following reclamation of 182 acres.	Construction disturbance and/or loss of 581 acres of habitat and vegetative cover. Net new long-term disturbance following reclamation of 237 acres.	Construction disturbance and/or loss of 417 acres of habitat and vegetative cover. Net new long-term disturbance following reclamation of 150 acres.	Implement BMPs and SOPs for site reclamation, restoration, and revegetation, as appropriate Identify and remove protected plant species from construction corridors and replant later Adhere to BLM's standard weed control stipulations Place signs to discourage off-road vehicle (OHV) use
	Protected species of cactus and yuccas along utility corridors may be impacted				

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
	Increased potential for the introduction and spread of noxious weeds and possibly increased OHV use along the improved access road				
Pah Rah Parcel	Native vegetation condition would be enhanced under BLM management through regulated livestock grazing, fire suppression, and monitoring				None
Cumulative Effects	Acres of vegetation potentially affected would be the same as described for desert tortoise. Direct impacts would result from construction activities, and some indirect impacts would result from increased public access and maintenance activities. Vegetation impacts would result from direct removal and fragmentation of habitat, degradation caused by soil compaction, and increased erosion. The potential for the introduction and spread of noxious weeds via vehicles and soil disturbances would increase.				All of the interrelated projects would involve mitigation measures designed to avoid or reduce impacts on vegetation.
3.5.3 and 4.5.3—Wild Horses and Burros					
Toquop Area	None	None	None	None	
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None
3.5.4 and 4.5.4—Wildlife and Fisheries Resources					
Toquop Area	Construction disturbance and/or loss of 449 acres of wildlife habitat. Net new long-term disturbance of 182 acres.	Construction disturbance and/or loss of 451 acres of wildlife habitat. Net new long-term disturbance of 182 acres.	Construction disturbance and/or loss of 581 acres of wildlife habitat. Net new long-term disturbance of 237 acres.	Construction disturbance and/or loss of 417 acres of wildlife habitat. Net new long-term disturbance of 150 acres.	Implement BMPs for biological resources, landscape preservation and impact avoidance, and reclamation, restoration, and revegetation Place signs warning of desert bighorn sheep crossing along the access road The evaporation pond water quality will be monitored and active mitigation will be implemented when water quality reaches levels that could have adverse impacts on avian fauna.
	Direct and indirect effects on wildlife species resulting from ground-disturbing construction activities; increased human activities during project construction, operation, and maintenance; and increased public access.				

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
	Potential effects include disturbance and localized displacement of mobile species and some loss of less mobile species, such as reptiles and small mammals				
	Desert bighorn sheep may be impacted by increased traffic on the improved access road in a portion of the East Mormon foothills				
	Waterfowl, shorebirds, and other water birds may be impacted by the highly saline evaporation pond				
	No direct or indirect effects on aquatic habitat and fisheries of the Virgin River				
Pah Rah Parcel	Management of important wildlife habitat (for example, sage grouse) would be enhanced under BLM administration				None
Cumulative Effects	Cumulative direct and indirect impacts on wildlife and their habitat would be similar to the kinds of cumulative impacts described for desert tortoise (a threatened wildlife species) and vegetation (wildlife habitat). An ongoing potential exists for added incremental impacts on wildlife and wildlife habitat from other projects in the region, as well as regional benefits to wildlife from Habitat Conservation Plans				All of the interrelated projects would involve mitigation measures designed to avoid or reduce impacts on wildlife
3.5.5 and 4.5.5—Wetlands/Riparian Zones, Floodplains, and Waters of the United States					
Toquop Area	Approximately 50 ephemeral washes would be crossed by project features	Approximately 94 ephemeral washes would be crossed by project features	Approximately 92 ephemeral washes would be crossed by project features	Approximately 50 ephemeral washes would be crossed by project features	Restore and revegetate affected ephemeral washes according to conditions of a Clean Water Act Section 404 Permit Also, see BMPs, SOPs, and mitigation above for *Surface Water Hydrology*
	No impacts on wetlands/riparian zones or floodplains except as noted above in *Surface Water Hydrology*				
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
3.6.1 and 4.6.1—Air Quality					
Toquop Area	Effects would primarily be short-term and localized, resulting from construction activities that create fugitive dust and vehicle and equipment engine emissions. Some degradation of air quality during construction and operation but no modeled violations of air quality standards				Implement air pollution prevention BMPs and SOPs to comply with federal requirements of the Prevention of Significant Deterioration (PSD) permitting program of the Clean Air Act Use best available control technologies (BACTs) for regulated emissions vented through stacks and vents and for sources of fugitive dust emissions during project construction, operation, and maintenance
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	The combined effects of the proposed project, other sources with emission permits or submitted permit applications, all reasonably foreseeable actions, plus natural background concentrations would be well below allowable standards for all pollutants				None
3.6.2 and 4.6.2—Noise					
Toquop Area	Noise would exceed ambient levels during construction (85 to 98 dBA at 50 feet) and operation (60 dBA at 550 feet) at a relatively minor level. No sensitive receptors exist.				Implement BMPs and SOPs for noise pollution prevention
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None
3.7 and 4.7—Visual Resources					
Toquop Area	Presence of vehicles, equipment, personnel, activities, and project features in the viewshed during construction and operation				Implement BMPs and SOPs to minimize fugitive dust emissions and restore disturbed areas Use colors, non-glare materials, lighting, structure orientation, and landscaping to blend project features with the environment and comply with the BLM's Visual Resource Management (VRM) Class III and Class IV for the Toquop area

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
	No effect on visual experience from the Mormon Mountains Wilderness Study Area (WSA) approximately 5.5 miles distant				
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None
3.8 and 4.8—Recreation Resources					
Toquop Area	Discontinuation of limited, existing recreation opportunities on the fenced portions of the power plant sites would be offset by improved recreationists access to the area because of the upgraded access road				None
Pah Rah Parcel	Transferring ownership from private to public would make the Pah Rah parcel available for public recreation				None
Cumulative Effects	None	None	None	None	None
3.9 and 4.9—Land Use, Prime or Unique Farmland, Rangelands					
Toquop Area	Removal of up to 17 acres in the wellfield from current livestock use may affect portions of the White Rock, Garden Springs, Summit Spring, and Snow Spring allotments			Removal of up to 5 acres in the wellfield from current livestock use may affect portions of the White Rock, Garden Springs, Summit Spring, and Snow Spring allotments	Implement BMPs and SOPs associated with fences and wire gates, repair any damages to existing range improvements, and include Big Galleta grass in the seed mix to revegetate disturbed corridors Obtain a variance or special use permit to develop a non-agricultural facility in an agricultural zoned area, and coordinate with others relative to grazing issues At the northern power plant site repair any loss of range improvement developments
	Temporary disturbance of rangeland managed for livestock use along the utility corridors in the Garden Springs and Gourd Spring allotments				

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
			Removal of 640 acres of rangeland within the Garden Springs Allotment being managed for livestock use may reduce permitted grazing use by 46 AUMs		
Pah Rah Parcel	Grazing may be facilitated under BLM administration through the integrated management of this parcel and adjacent public lands				None
Cumulative Effects	None	None	None	None	None
3.10 and 4.10—Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers					
Toquop Area	Construction disturbance of 222 acres of habitat within the Mormon Mesa ACEC along the improved access road from Interstate 15 (I-15) to the southern power plant site. This consists of 143 acres in Lincoln County managed by the BLM Ely Field Office and 79 acres in Clark County managed by the Las Vegas Field Office. Following reclamation, a net new long-term disturbance of 65 acres (42 acres in Lincoln County, 23 acres in Clark County).				Implement BMPs and SOPs for road construction and site reclamation, and consult with BLM and FWS to minimize the potential for environmental impacts Limit OHV access and the potential for noxious weed/invasive plant introductions, and educate employees on related issues
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
3.11 and 4.11—Wastes, Hazardous and Solid					
Toquop Area	None	None	None	None	Develop and implement a Spill Prevention Control and Countermeasures Plan (SPCCP) Proper onsite storage, containment, and handling of hazardous and solid wastes Offsite disposal at a licensed facility of hazardous and solid wastes that have accumulated onsite
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None
3.12 and 4.12—Cultural and Historical Resources and Native American Religious Concerns					
Toquop Area	Ten sites and two isolated artifacts would be affected directly. None of these sites or isolates are eligible for listing on the National Register of Historic Places (NRHP)	Twelve sites and nine isolated artifacts would be affected directly. One of these sites is eligible for listing on the NRHP.	Six sites and ten isolated artifacts would be affected directly. One of these sites is eligible for listing on the NRHP.	Ten sites and two isolated artifacts would be affected directly. None of these sites or isolates are eligible for listing on the NRHP.	Implement stipulations of the Cultural Resources Programmatic Agreement (see Appendix C for detail), including resource avoidance or recovery; consultation with the State Historic Preservation Office and interested parties, including Indian Tribes, to develop site-specific mitigation measures; and processes for the inadvertent discovery of human remains and unanticipated finds during construction
	Indirect impacts could potentially result from greater human activity in the area and possibly increased OHV use				Without additional information from Indian Tribes, no avoidance or other mitigation measures can be developed for any issues or concerns they may have

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
	Some Indian Tribes have indicated to BLM that they have no concern about the Proposed Action and its alternatives. For other Indian Tribes, BLM has requested, but not received, sufficient information to establish whether project-related issues exist for Native Americans, including any issues related to the location and use of the Salt Song Trail. Concerns have been expressed for the preservation of all archaeological sites.				
Pah Rah Parcel	Transfer of this parcel to public ownership may help ensure long-term protection/stewardship of cultural resources on the parcel				None
Cumulative Effects	No known cumulative effects				None
3.13 and 4.13—Indian Trust Assets					
Toquop Area	None	None	None	None	None
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None
3.14 and 4.14—Environmental Justice					
Toquop Area	None	None	None	None	None
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None
3.15 and 4.15—Paleontological Resources					
Toquop Area	None	None	None	None	None
Pah Rah Parcel	None	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
Cumulative Effects	None	None	None	None	None
3.16 and 4.16—Socioeconomics					
Toquop Area	Project would generate short-term (500 to 950 jobs) and long-term (25 jobs) employment, income, and tax base opportunities				Provide onsite fire and emergency medical services Develop a police, fire, and medical aid agreement through consultation with Lincoln County.
	Substantial economic benefits to Lincoln County from increased tax receipts would total approximately $14 million during the 26-month construction period and an additional $390,000 per year during each year of the 40 years of power plant operation under the Proposed Action and Alternative 1. Construction cost for Alternative 2 is 6 percent higher, and construction cost under Alternative 3 is 3 percent higher resulting in a proportional increase in tax receipts during construction.				
	Lincoln County's estimated share of the leased water rights (up to 7,000 acre-feet per year) would be up to $9 million over the life of the project			Lincoln County would not receive an income for the lower quantity of water (up to 170 acre-feet per year) under Alternative 3	
	Increased project-related sales tax disbursed back to Clark County would be small relative to the County's current total tax receipts				
	Increased property tax income to Lincoln County from the land exchange would be beneficial to the county's current total property tax income				
	No adverse impacts on economic variables or community infrastructure in the Lincoln/Clark County area although project would place additional demand on police protection, fire protection, and emergency medical services.				
Pah Rah Parcel	Decreased property tax income to Washoe County from the land exchange would not substantially affect county tax receipts				None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	Alternative 3	BMPs, SOPs, and Mitigation[2]
Cumulative Effects	Types of potential cumulative beneficial effects (jobs, income, tax receipts) and adverse effects (police, fire, and medical needs) would be the same as for the proposed project, with no adverse impacts because of project-related BMPs, SOPs, and mitigation				Same as for proposed project
3.17 and 4.17—Transportation					
Toquop Area	Temporary 26-month increase in average daily traffic on I-15 near the East Mesa Interchange and at the interchange during project construction				Implement BMPs and SOPs for transportation such as scheduling work to minimize generation of additional traffic, scheduling vehicles to create smooth traffic flow patterns, yielding right-of-way at constricted areas, and regulating project vehicles' speeds
	No long-term impacts				
Pah Rah Parcel	None	None	None	None	None
Cumulative Effects	None	None	None	None	None

[1] Refers to detailed resource discussions in EIS sections of Chapter 3 (Affected Environment) and Chapter 4 (Environmental Consequences).

[2] Detailed BMPs, SOPs, and mitigation measures are contained in EIS Appendix A for desert tortoise and their habitat; Appendix B for BMPs and SOPs associated with project construction, operation, and maintenance covering a broad range of resource areas and activities; and Appendix C for cultural resources. These measures also include complying with the terms and conditions of all ROWs issued by the BLM.

Chapter 1
Introduction

Chapter 1.0 Introduction

1.1 General Overview

This document represents the *Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and the Final Environmental Impact Statement (FEIS)* for the proposed Toquop Energy Project in southern Nevada. The Proposed Action and alternatives evaluated in this document were developed in response to a proposal by Toquop Energy, Inc. (Toquop Energy) to construct and operate up to a 1,100-megawatt (MW) natural gas-fired water-cooled electric power generating plant. The plant and associated features (access road, utility corridors, and wellfield) in Lincoln County, Nevada, would be located on lands presently managed by the Ely Field Office of the U.S. Bureau of Land Management (BLM). A portion of the plant access road would be on land in Clark County, Nevada, presently managed by the Las Vegas Field Office of the BLM. This document evaluates three BLM actions and the potential environmental effects that would result from: 1) issuance of Rights-of-Way (ROWs) under FLPMA for the construction and operation of the electric power generating plant, access road, water pipeline, and wellfield; 2) evaluation of the effects of adopting the *Proposed Toquop Land Disposal Amendment to the Caliente Management Framework Plan*, which would identify specific sections of public land as suitable for disposal; and 3) exchange of a federally managed parcel of public land where the plant would be located for a private parcel of land owned by the Nevada Land and Resource Company, LLC (NLRC).

This document was prepared in compliance with the Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) (40 CFR § 1500-1508); the *NEPA Handbook,* H-1790-1; the Ely Field Office *Environmental Analysis Guidebook*; Sections 201, 202, and 206 of the Federal Land Policy and Management Act (FLPMA) of 1976 (43 CFR § 1600); and the *Land Use Planning Handbook* (BLM Handbook H-1601-1). The BLM is the federal lead agency in the NEPA process and development of this document. The U.S. Army Corps of Engineers (USACE) is a cooperating agency.

1.2 Purpose

The proposed plant would generate electrical power at competitive costs for use by consumers to ease the near- and long-term shortages of power in the western United States. The proposed project would contribute to meeting the demand for power in the Western Systems Coordinating Council (WSCC) service area, including the Las Vegas area, and would also contribute to meeting the capacity and annual energy requirements for the remainder of the Arizona-New Mexico-southern Nevada power area.

The project would provide economic benefits to Lincoln County, Nevada, which will provide opportunities for an increased tax base and increased employment opportunities.

The project would provide the BLM with a mechanism for acquiring a desirable parcel of private land in the Pah Rah Range in northwestern Nevada and would facilitate

public land management by the BLM by creating contiguous tracts of land.

1.3 Need and Background

The WSCC estimates a demand for approximately 11,300 MW of new power plant generation to be constructed in its region of the western United States over the next 10 years to maintain reliable operation of the transmission system. The Toquop project would provide much needed support to the overall energy supply in this region and contribute approximately 10 percent of the projected demand for new generation within the WSCC. Based on data available from the WSCC, the 2002 Operating Reserve Margin (the difference between available capacity, excluding transfers, and peak demand) for the Las Vegas area and the Arizona-New Mexico-southern Nevada area is minus 2.9 percent. This indicates that the area relies on importing electricity to meet peak demands. This situation is the result of growth in the demand for electricity to serve a fast growing region. The proposed project would significantly strengthen the electric grid in the Las Vegas area, including the City of Mesquite, based on the flow of electric power on the existing transmission system.

Needed and desired economic benefits would result from the construction and operation of the power plant. Lincoln County is approximately 98 percent public land with limited industrial and commercial development. Lincoln County ranks near the bottom among Nevada's counties in population, total personal and per capita income, and tax revenues.

Development of the proposed power plant and associated linear facilities would provide important increases to the Lincoln County tax base through sales, use, and property taxes on the power plant improvements. The construction and operation of the power plant would have positive effects on employment opportunities and result in increased revenue from project-related purchases of goods and services.

The land exchange would be between NLRC and BLM's Carson City Field Office. NLRC owns over 1.2 million acres of land in northern Nevada, lying in a checkerboard pattern interspersed with other privately owned and federally managed public lands. Much of the NLRC land has many resources desirable to the BLM (such as sage grouse habitat) and is identified for acquisition in BLM land use plans. Since certain disposable BLM-managed lands are desirable for economic development by NLRC, this land exchange would benefit both parties and the general public.

1.4 Project Location

The Toquop Energy Project area is located in Lincoln County in southern Nevada on public lands managed by the Ely Field Office of the BLM (see Map 1-1). The power plant site for the Proposed Action is near the Toquop Wash, approximately 50 miles south-southeast of Caliente and 12 miles northwest of Mesquite. This site is referred to as the Toquop southern parcel in this EIS. An alternative power plant site is approximately 12 miles north-northwest of the Toquop Wash plant site. This site is referred to as the Toquop northern parcel in this EIS. Approximately 640 acres of private land (the Pah Rah parcel) presently owned by the NLRC in the Pah Rah Range in Washoe County in northwestern Nevada (see Map 1-2) could be exchanged for a similarly valued parcel of public land at the Toquop Wash plant site (southern parcel) or at the alternative

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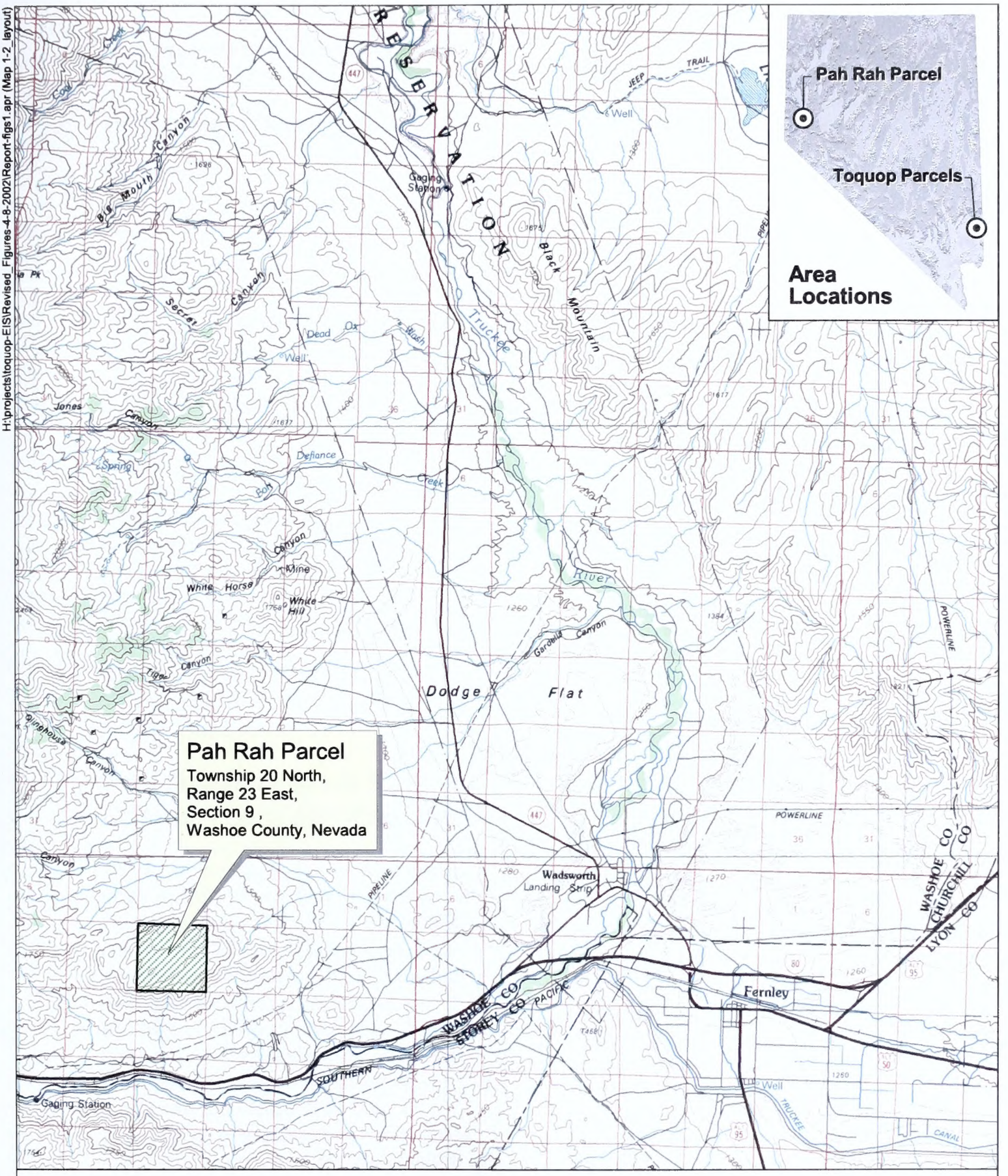
R67E
R68E
R69E
R70E
R71E
T8S
T9S
T8 1/2S
T10S
T10 1/2S
T11S
T12S
T13S
UTAH
NEVADA
ARIZONA
Alternative Power Plant Site
Tule Desert
Garden Wash
Jumbled Mtn.
Hills
Springs
Tule
Toquop Gap
Toquop Wash
Mormon Mountains
Mormon East
Proposed Power Plant Site
Existing Electrical Transmission Line
Existing Natural Gas Line and Electrical Transmission Lines
LINCOLN COUNTY
CLARK COUNTY
Mesa
Halfway Wash
Flat Top
Mesquite
Virgin River
15
Pah Rah Parcel
Toquop Parcels
Area Locations
N
0 6250 12500 18750 Feet
Source:
1:100,000 Vector Linework - BLM Nevada,
Project Area
Map 1-1
CH2MHILL



Source:
Maptech 1:24,000 Scanned Topo Maps

Vicinity Map of the Pah Rah Parcel

Map 1-2

CH2MHILL

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plant site in Lincoln County (northern parcel).

1.5 Policies, Plans, and Programs

1.5.1 Plan Conformance

Exchange of the Pah Rah Range parcel is consistent with existing land use plans in Washoe County and the BLM *Carson City Field Office Consolidated Resource Management Plans* (CRMP) and would provide an opportunity to consolidate public lands for more logical and beneficial land management. However, the Toquop parcels of public land in Lincoln County have not been identified for disposal in the current Caliente MFP. Therefore, amending the MFP would be required in order for the land exchange to occur. The portion of the plant access road that would be located in Clark County would meet the requirements of the Las Vegas Field Office of the BLM, including the Las Vegas RMP.

1.5.2 Relationships to BLM Policies, Plans, and Programs

The BLM is responsible for managing lands needed for the Toquop Energy Project. Toquop Energy's use of public land in the Caliente Management Area requires conformance with BLM's land management policies, as well as the FLPMA of 1976 (as amended). The BLM must review Toquop Energy's development plans to ensure that adequate provisions are included to: prevent unnecessary degradation of public lands and their resources; ensure reclamation of disturbed areas; and ensure compliance with applicable state and federal laws. Approved BLM land use plans in adjacent administrative units include the *Las Vegas RMP, Arizona Strip Field Office RMP, Virgin River MFP*, and the *Nellis Air Force Range Resource Plan.*

The BLM would be required to amend the Caliente MFP to identify the parcel of public land needed for the power plant as being suitable for disposal. The BLM could then proceed with the land exchange. In addition, the BLM could issue ROWs for 42 years—covering the construction and expected operational life of the project—for the access roads, utility corridors, and well sites. An option to the land exchange would be to keep all public lands needed for the project under BLM management and to issue ROWs for the power plant site as well as the linear facilities. This option does not require amending the Caliente MFP, but it does require compliance with NEPA and is, therefore, addressed in *Chapter 4, Environmental Consequences*, of this document.

1.5.3 Relationships to Non-BLM Policies, Plans, and Programs

The Proposed Action and other action alternatives are consistent with approved resource-related policies and programs of other federal agencies, Indian Tribes, local governments, and the State of Nevada. Approved land use plans for other adjacent federal administrative units include the *Desert Wildlife Range Management Plan.* Plans approved by adjacent counties include the *Clark County Multiple Species Habitat Conservation Plan* (HCP) (Nevada), the Lincoln County Policy Plan for Public Lands, a chapter of the *Nevada Statewide Policy Plan for Public Lands*, the *Lincoln County Master Plan Evaluation and 1992 Update*, the *Lincoln County Public Land Management and Use*

Plan, and the *Washington County HCP* (Utah).

The land exchange would place about 640 acres of BLM-managed lands in Lincoln County in private ownership and on the Lincoln County tax roles which would be consistent with a resolution passed by the Lincoln County Commissioners on June 20, 1994. That resolution opposed land exchanges that either take land off of county tax roles or place land into a tax exempt status. The proposed project would result in additional property tax revenues for Lincoln County.

1.6 Management Framework Plan Amendment Process Overview

The land use planning process, as mandated by FLPMA, requires the BLM to solicit and incorporate public input in the management of public lands, while still complying with the laws and policies established by Congress and the Executive Branch of the federal government. Amendments to approved land use plans are developed using the planning process described in the following text.

1.6.1 Identification of Issues

Issues drive the plan amendment process and indicate concerns that the BLM and the public may have regarding the management of specific resources in a planning area. An issue is defined as an opportunity, conflict, or problem pertaining to the management of public lands and associated resources.

Identification of issues orients the planning process so that interdisciplinary analysis and documentation are directed toward resolution of those issues.

This amendment of the Caliente MFP constitutes a single-issue planning document that addresses the effects of the proposed land disposal in Lincoln County, Nevada. It responds to the following planning question: what effects, if any, on physical, biological, social, and economic resources will result from the disposal of public lands?

1.6.2 Development of Planning Criteria

Planning criteria are formulated to guide the development of a land use plan amendment and the evaluation of the Proposed Action and alternatives. The criteria are derived from laws; Executive Orders; regulations; planning principles; BLM guidance; consultation with interest groups and the general public; and available resource information for the area. Table 1-1 lists the planning criteria for the Toquop Land Disposal Amendment to the Caliente MFP.

1.6.3 Inventory and Data Evaluation

Using the planning criteria and focusing on the proposed land disposal, BLM specialists review and evaluate available data. These data include results of field examinations, published and unpublished studies, and consultations with individuals and staff from other agencies and organizations.

TABLE 1-1
Planning Criteria for the Toquop Land Disposal Amendment to the Caliente MFP

Comply with applicable laws, Executive Orders, and regulations listed in Section 1.7.1 Applicable Laws and Regulations and Table 1-2 of this document.
Management direction within the existing Caliente MFP, except for the proposed parcels of publicly administered land in Lincoln County to be considered for disposal.
Use a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, social, and economic aspects of disposal of the Lincoln County parcels.
Weigh short-term and long-term benefits and detriments to Lincoln County.
Coordinate BLM resource inventory, planning, and management activities in the amended Caliente Planning Unit with the resource planning and management programs of other federal agencies, state and local governments, and Indian Tribes, to the extent consistent with applicable laws.
Rely on available inventories and existing resource data for the Lincoln County parcels considered for disposal to reach sound management decisions.
Define any BLM-administered critical habitat for federally protected species within the Lincoln County parcels considered for disposal.
Develop and implement management actions on lands adjacent to the Lincoln County parcels, as appropriate, to accomplish the goals and objectives of recovery plans for any federally listed species.
When public land acreage is no longer available for grazing, there is an implied reduction to livestock grazing. Actual reductions in livestock grazing may or may not occur as a result of this proposed land exchange, depending on whether or not current management practices can facilitate the change in public land that remains available for livestock grazing.

1.6.4 Analysis of the Existing Condition

An analysis of the existing condition and capabilities of resources within the land parcels that could be disposed is contained in this EIS. The analysis provides the database for developing and evaluating alternatives and is generally incorporated into the Final Plan Amendment as the Affected Environment, and to some extent, the No Action Alternative.

1.6.5 Formulation of Alternatives

On the basis of the issues, planning criteria, and concerns raised during scoping, and in public comments on the DEIS, the Proposed Action and three other comprehensive action alternatives were developed for consideration. The No Action Alternative represents a continuation of present activities. The Proposed Action and each of the other action alternatives must meet the purpose and need for action and address the issues, while emphasizing different management. For this project, several alternatives were considered but eliminated from detailed analyses. These are described in *Chapter 2, Section 2.7, Alternatives Considered During Scoping but Eliminated from Further Consideration*, with a discussion of why they were not considered further.

1.6.6 Estimation of the Effects of Alternatives

In accordance with NEPA, the physical, biological, social, and economic effects of implementing the Proposed Action and

each alternative are estimated in order to allow for a comparative evaluation of impacts (see *Chapter 4, Environmental Consequences*).

1.6.7 Selection of the Preferred Alternative

The Ely Field Manager recommends a Preferred Alternative to the Nevada State Director, based on the issues and information identified through the planning process; coordination and consultation with other entities; and the impact analyses of the Proposed Action and alternatives. The Proposed Toquop Land Disposal Amendment to the Caliente MFP/DEIS was distributed to the public, including other government agencies and interest groups, for a 90-day review and comment period.

1.6.8 Selection of the Proposed Plan Amendment

Following the public review and comment period on the draft document, the Ely Field Manager recommends a Proposed Caliente MFP Amendment to the Nevada State Director. Based on an evaluation of the public comments, the BLM may retain the Preferred Alternative or select a different alternative from the range of alternatives identified in the Draft Plan Amendment. The Proposed Toquop Land Disposal Amendment to the Caliente MFP/Final EIS will be filed with the Environmental Protection Agency (EPA) and distributed to the public for review.

1.6.9 Monitoring and Evaluation

Monitoring and evaluation would be conducted at 5-year intervals for the Caliente MFP. These data would be used to determine the effectiveness of the plan amendment in achieving the desired results; to ensure that Best Management Practices (BMPs), Standard Operating Procedures (SOPs), and mitigation measures are satisfactory; and to ascertain whether there have been changes in related plans of other federal, state, or local governments. Any information gained would be incorporated into future planning, including other amendments or revisions to the Caliente MFP.

1.7 Applicable Laws and Regulations and Authorizing Actions and Permits

1.7.1 Applicable Laws and Regulations

Table 1-2 lists laws and regulations potentially applicable to the Proposed Action and other action alternatives.

1.7.2 Permits and Approvals

Table 1-3 lists federal, state, county, and other permits and approvals that may be needed to implement the Proposed Action or other action alternatives.

1.8 Interrelated Projects

CEQ guidelines for the preparation of EISs require that cumulative impacts be addressed in addition to direct and indirect impacts. Cumulative impacts are those incremental impacts that would result from the effects of the Proposed Action or action alternatives when added to the effects of other past, present, and reasonably foreseeable projects. The BLM recognizes the need for a thorough analysis of potential cumulative effects, not only from power plant siting activities,

but from other development activities as well.

This section identifies nine large interrelated projects whose cumulative impacts may potentially extend across a broad range of the resource categories being assessed in this document (see Map 1-3). Each project has been evaluated to determine if it is sufficiently defined (reasonably foreseeable) to be: 1) relevant to potential impacts; 2) within the project area of influence; and 3) of a magnitude that could potentially result in a cumulative impact. Descriptions and cumulative effects, if any, of the projects listed below are presented in *Section 4.18, Cumulative Impacts,* of *Chapter 4, Environmental Consequences*, together with any other projects not listed here whose effects would be very resource-specific. The nine large, interrelated projects considered in the cumulative impacts analysis include the following:

- Sale and build-out of the Mesquite Land Act property
- Sale and build-out of the Lincoln County Land Act property
- Coyote Springs Development Project
- Moapa Paiute Energy Center
- Meadow Valley Generating Project
- Moapa Energy Facility Project
- Apex Generating Station Project
- Silverhawk Power Station Project
- Kern River 2003 Pipeline Expansion

TABLE 1-2
Laws and Regulations that may Apply to the Proposed Action and Other Action Alternatives of the Toquop Energy Project

National Environmental Policy Act (NEPA) 42 USC 4321 et seq.
Council on Environmental Quality (CEQ) general regulations implementing NEPA (40 CFR Parts 1500-1508)
Department of the Interior's (DOI) implementing procedures and proposed revisions (August 28, 2000, Federal Register)
Bureau of Land Management's (BLM) NEPA Handbook H-1790-1 (1988)
National Historic Preservation Act (NHPA) and regulations implementing NHPA 16 USC 470 et seq.
Antiquities Act of 1906 16 USC 431 et seq.
Archeological Resources Protection Act, as amended (ARPA) 16 USC 470aa et seq.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)
Clean Air Act (CAA) 42 USC 7401 et seq.
Clean Water Act (CWA) 33 USC 1251 et seq.
Endangered Species Act (ESA) 16 USC 1531 et seq.
Nevada Division of Forestry Critically Endangered Flora Law (NRS 5.27-5.33)
Noise Control Act of 1972, as amended (NCA) 42 USC 4901 et seq.
Occupational Safety and Health Act (OSHA) 29 USC 651 et seq. (1970)
Mineral Leasing Act (gas pipeline to Toquop northern parcel)
Pollution Prevention Act of 1990 (PPA) 42 USC 13101 et seq.

TABLE 1-2
Laws and Regulations that may Apply to the Proposed Action and Other Action Alternatives of the Toquop Energy Project

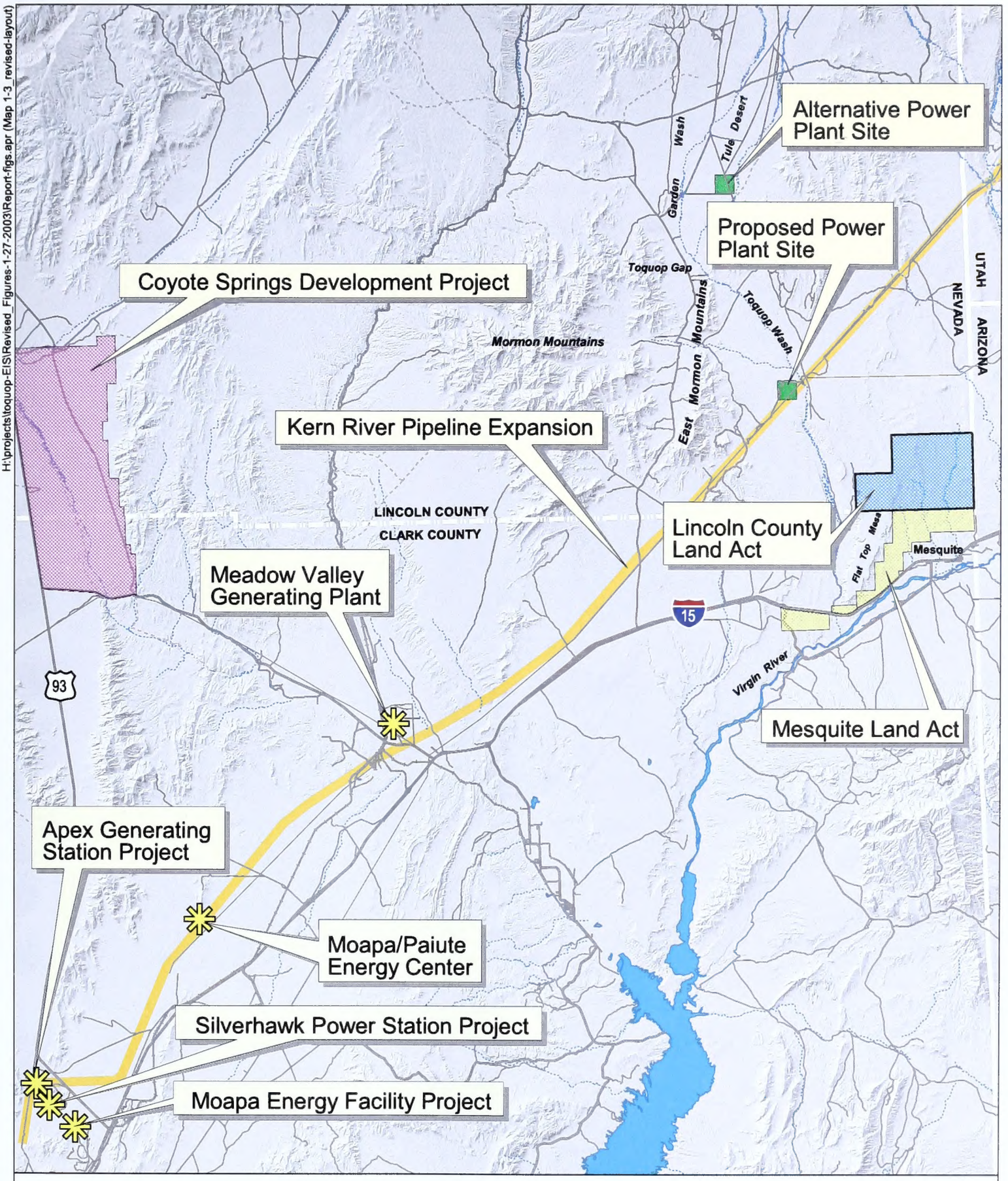
Safe Drinking Water Act (SDWA) 42 USC s/s 300f et seq. (1974)
Migratory Bird Treaty Act (Migratory Bird Guidance) 16 USC 703–711 Executive Order January 1, 2001
NEPA, Protection and Enhancement of Environmental Quality Executive Order 11512
National Historic Preservation Executive Order 11593
Floodplain Management Executive Order 11988
Protection of Wetlands Executive Order 11990
Federal Compliance with Pollution Control Standards Executive Order 12088
Environmental Justice Executive Order 12898
Indian Sacred Sites Executive Order 13007
American Indian Religious Freedom Act of 1978 (42 USC 1996)
Consultation and Coordination with Indian Tribal Governments Executive Order 13084
Invasive Species Executive Order 13112
Memorandum for the Heads of Executive Departments and Agencies (signed by President Clinton on April 29, 1994)
Responsibilities, and the Endangered Species Act, Secretarial Order 3206 (June 5, 1997)
Federal Land Policy and Management Act of 1976 (FLPMA) 43 USC 1701 et seq.
Federal Land Exchange Facilitation Act of 1988 (FLEFA), amended FLPMA
BLM land exchange regulations 43 CFR 2200
BLM right-of-way regulations 43 CFR 2800

TABLE 1-3
Federal, State, County, and Other Permits and Approvals that may be Needed to Implement the Proposed Action or Other Action Alternatives of the Toquop Energy Project

Federal Permits and Approvals
Bureau of Land Management NEPA Record of Decision for Proposed Action
Bureau of Land Management Rights-of-Way and Temporary Use Permits for water pipelines, transmission lines, access roads, gas pipeline, and other ancillary approvals
Bureau of Land Management Amendment of the Caliente Management Framework Plan and Planning Document
U.S. Fish and Wildlife Service, Endangered Species Act Section 7 Consultation and Biological Opinion
U.S. Army Corps of Engineers, Section 404/Section 10 Permit
Acid Rain (Title IV CAA) Permit
U.S. Environmental Protection Agency, Region IX, Title V (CAA) Operating Permit
U.S. Environmental Protection Agency, Section 402 National Pollutant Discharge Elimination System Notification for Stormwater Management during Construction
U.S. Environmental Protection Agency, Section 402 National Pollutant Discharge Elimination System Notification for Stormwater Management during Operation

TABLE 1-3
Federal, State, County, and Other Permits and Approvals that may be Needed to Implement the Proposed Action or Other Action Alternatives of the Toquop Energy Project

State of Nevada Permits and Approvals
Nevada State Historic Preservation Office (SHPO), Section 106 review and concurrence, per National Historic Preservation Act for BLM lands, per protocol between BLM and Nevada SHPO
Nevada Division of Wildlife, Region 3 Project Review: Wildlife and Habitat Consultation for disturbance on BLM land
Nevada Division of Wildlife—Authorization for take or removal of state-protected reptiles
Temporary Discharge Permit—Nevada Division of Environmental Protection, Bureau of Water Pollution Control
Nevada Public Utility Commission Utility Environmental Protection Act
Nevada Division of Forestry, Native Cacti and Yucca Commercial Salvaging and Transportation Permit
Nevada Division of Forestry, Permit for the Take of Critically Endangered Flora
Nevada Division of Environmental Protection, Section 401 Water Quality Certification
Water Right Permit-State Engineer—Nevada Department of Water Resources
Prevention of Significant Deterioration Program Major Source Permit—Nevada Department of Environmental Quality
Dust Control Permit— Nevada Department of Environmental Quality
Ground Water Discharge Permit— Nevada Division of Environmental Protection, Bureau of Water Pollution Control
Industrial Artificial Pond Permit—Nevada Division of Wildlife
Nevada Department of Transportation Encroachment Permit
Lincoln County and Clark County Permits and Approvals
Lincoln County Master Plan Amendment, Zone Change, and Special Use Permit
Grading permits for power plant, water pipeline, wellfield, and access road on BLM land
Clark County Multiple Species Habitat Conservation Plan
Southeast Lincoln County Multiple Species Habitat Conservation Plan
Other Permits and Approvals
Kern River Gas Transmission Company Encroachment and Approval
Approval for interconnection with the Navajo-McCullough Electric Transmission Line
Approval for interconnection with the Red Butte-Harry Allen Electric Transmission Line



N

0 3.5 7 Miles

Interrelated Projects

Source:
1:100,000 Vector Linework - BLM Nevada

Map 1-3

CH2MHILL

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Chapter 2
Description of Proposed Action and Alternatives

Chapter 2.0 Description of Proposed Action and Alternatives

2.1 Introduction

This chapter describes the Proposed Action, three other action alternatives, and the No Action Alternative for the Toquop Land Disposal Amendment to the Caliente MFP and Toquop Energy Project. They are analyzed in detail in *Chapter 4, Environmental Consequences*, of this document and include the following:

- **Proposed Action.** Water-cooled power plant ROW, western utility alignment ROW, wellfield ROW, and access road ROW, southern power plant site ROW, Proposed Toquop Land Disposal Amendment to the Caliente MFP, and/or Toquop/Pah Rah land exchange (southern parcel).

- **Alternative 1.** Water-cooled power plant ROW, eastern utility alignment ROW, southern power plant site ROW, wellfield ROW, and access road ROW, Proposed Toquop Land Disposal Amendment to the Caliente MFP, Toquop land disposal (southern parcel) through sale or exchange.

- **Alternative 2.** Water-cooled power plant ROW, eastern utility alignment ROW, northern power plant site ROW, wellfield ROW, and access road ROW, Proposed Toquop Land Disposal Amendment to the Caliente MFP, Toquop land disposal (northern parcel) through sale or exchange.

- **Alternative 3.** Air-cooled power plant ROW, western utility alignment ROW, southern power plant site ROW, wellfield ROW, and access road ROW, Proposed Toquop Land Disposal Amendment to the Caliente MFP, Toquop land disposal (southern parcel) through sale or exchange.

- **No Action Alternative**

This chapter also describes alternative fuels, plant locations, and access roads that were considered during project formulation, but eliminated from detailed analysis.

The Proposed Action and each action alternative include the following project actions and features:

- Issue ROWs for Toquop Energy Project construction and operation.

- Construct, operate, and maintain a 1,100-MW (maximum) natural gas-fired electric power generating plant with an expected life of 42 years.

- Develop a wellfield in the Tule Desert to meet the process water needs of the power plant.

- Develop the linear infrastructure necessary to connect the power plant to the new water source, to existing natural gas and electric transmission lines serving the region, and to site access facilities.

The Proposed Action and Alternative 1 differ primarily in the location of the utility alignment (western vs. eastern). The Proposed Action and Alternative 2 differ primarily in the location of the power plant site (southern vs. northern) and, therefore, the parcel of BLM-managed public land to be exchanged or sold. The Proposed Action and Alternative 3 differ primarily in the method of cooling for the power plant. The power plant in the Proposed

Action would be water-cooled, and the power plant in Alternative 3 would be air-cooled. Maps 2-1, 2-2, and 2-3 show the locations of prominent features associated with the Proposed Action and Alternative 3, Alternative 1, and Alternative 2, respectively. As noted in Chapter 1, an option to the Proposed Action, Alternative 1, Alternative 2, and Alternative 3 as described here, is for the BLM to issue ROWs for all project features rather than proceed with this *Proposed Toquop Land Disposal Amendment to the Caliente MFP*. This issuance of ROWs is addressed in *Chapter 4, Environmental Consequences*.

As required for the issuance of ROWs, a Plan of Development (POD) would be finalized for the alternative selected for implementation. The POD will detail the methods and procedures to be used in the construction of the power plant, access road, and ancillary facilities. The POD will incorporate site-specific stipulations, terms, and conditions in order to satisfy all project-related construction requirements, as well as operational, maintenance, and restoration requirements, associated with lands administered by the Ely and Las Vegas Field Offices of the BLM where project features would be located.

The No Action Alternative represents the status quo—not approving or implementing the Proposed Action or any of the action alternatives. Analysis of the No Action Alternative is required by NEPA guidelines.

The Proposed Action, Alternative 1, and Alternative 2 were developed following public information meetings in Caliente and Mesquite, Nevada, and a scoping meeting in Las Vegas, Nevada, during July and August 2001. Comments received during those meetings and during the public scoping comment periods for the *Proposed Toquop Land Disposal Amendment to the Caliente MFP* were considered in formulating the Proposed Action and Alternatives 1 and 2. In addition, meetings were held with the U.S. Fish and Wildlife Service (FWS), local and regional staff of the BLM, and technical staff of the project proponents—Toquop Energy and NLRC—to aid in formulating the Proposed Action and Alternatives 1 and 2.

Based on these public comments and meeting discussions, the BLM decided to combine the Toquop Energy Project EIS with a related Environmental Assessment (EA) that BLM's Carson City Field Office had been preparing for the proposed Pah Rah/Toquop Land Exchange. That EA had been evaluating the exchange of approximately 640 acres of private land owned by the NLRC in the Pah Rah Range in Washoe County for a similarly valued, BLM-managed parcel of public land near the Toquop Wash in Lincoln County. Public scoping meetings on the proposed land exchange were held in Mesquite and Reno, Nevada, during July 2001. This proposed land exchange is now being evaluated as part of the Proposed Action in this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*.

A different land disposal would occur under Alternative 2. Under this alternative, a parcel of BLM-managed public land approximately 12 miles north-northwest of the Toquop Wash plant site would be made available for disposal. This alternative site would be adjacent to and contiguous with the proposed wellfield in the Tule Desert. That wellfield is necessary for the Proposed Action and all action alternatives.

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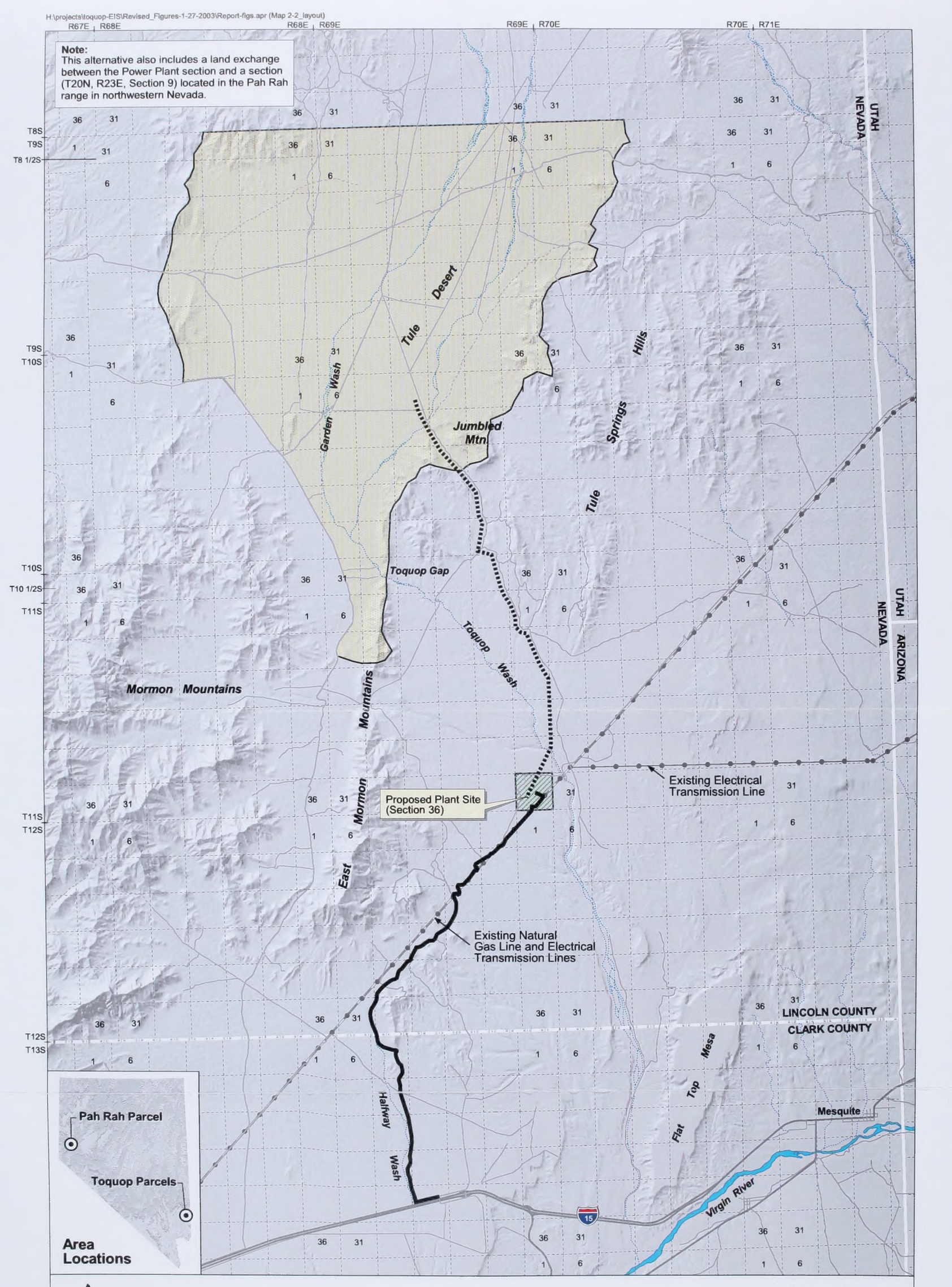
R67E
R68E
R69E
R70E
R71E
T8S
T9S
T8 1/2S
T10S
T10 1/2S
T11S
T12S
T13S
Note:
This alternative also includes a land exchange between the Power Plant section and a section (T20N, R23E, Section 9) located in the Pah Rah range in northwestern Nevada.
Tule Desert
Garden Wash
Jumbled Mtn
Hills
Springs
Tule
Toquop Gap
Toquop Wash
Mormon Mountains
Mormon Mountains
East
UTAH
NEVADA
ARIZONA
Proposed Plant Site (Section 36)
Existing Electrical Transmission Line
Existing Natural Gas Line and Electrical Transmission Lines
LINCOLN COUNTY
CLARK COUNTY
Mesa
Top
Fiat
Halfway Wash
Virgin River
Mesquite
15
Pah Rah Parcel
Toquop Parcels
Area Locations
N
0 6250 12500 18750 Feet
Source:
1:100,000 Vector Linework - BLM Nevada,
Legend
Wellfield
Access Road
Water Pipeline
Toquop Energy Project
Proposed Action and Alternative 3
(Proposed Action - Water Cooled
Alternative 3 - Air Cooled
All other features are the same)
Map 2-1
CH2MHILL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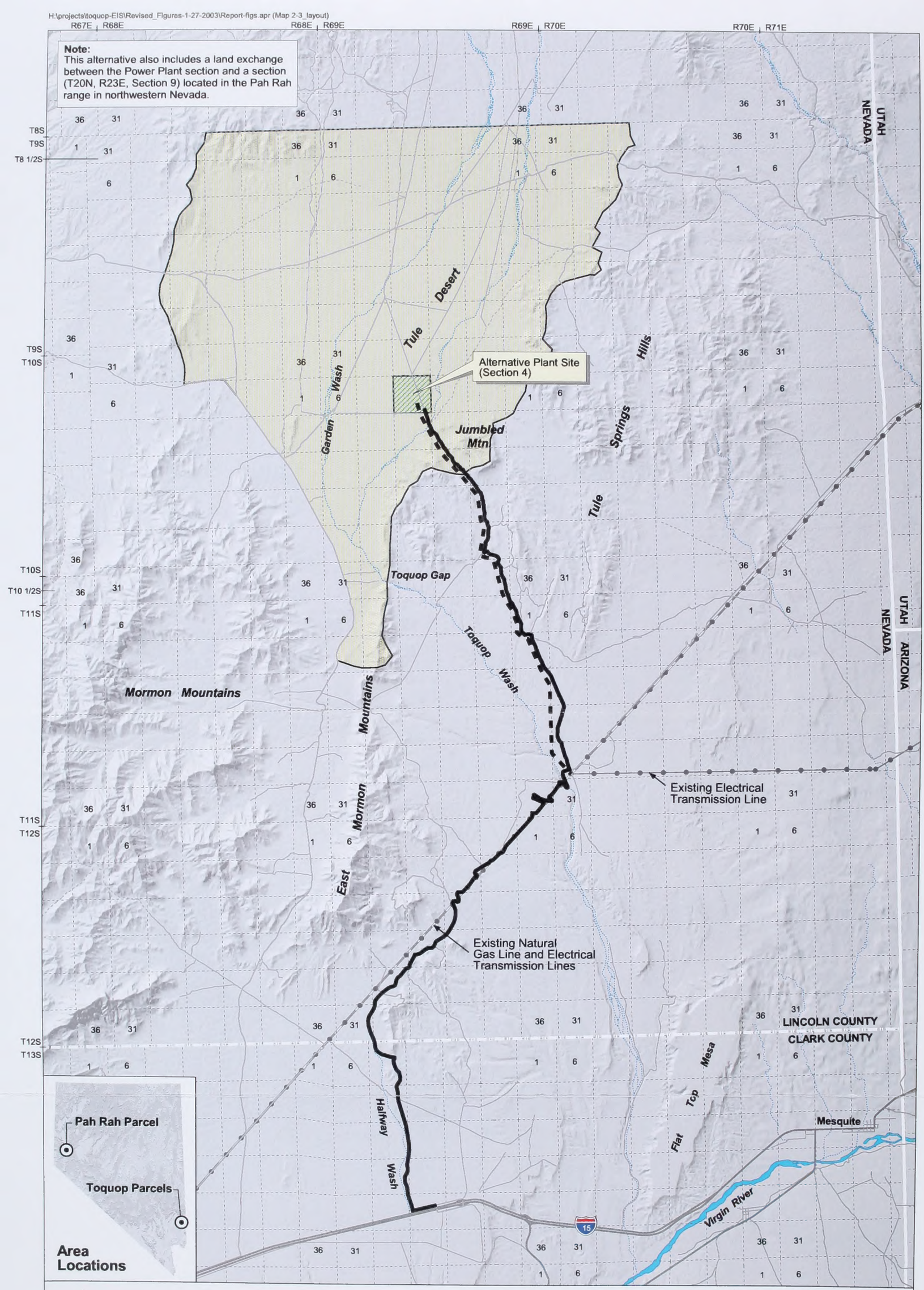
Note:
This alternative also includes a land exchange between the Power Plant section and a section (T20N, R23E, Section 9) located in the Pah Rah range in northwestern Nevada.
R67E
R68E
R69E
R70E
R71E
T8S
T9S
T8 1/2S
T10S
T10 1/2S
T11S
T12S
T13S
UTAH
NEVADA
ARIZONA
Tule Desert
Garden Wash
Jumbled Mtn
Hills
Springs
Tule
Toquop Gap
Toquop Wash
Mormon Mountains
Mormon Mountains
East
Proposed Plant Site (Section 36)
Existing Electrical Transmission Line
Existing Natural Gas Line and Electrical Transmission Lines
LINCOLN COUNTY
CLARK COUNTY
Mesa
Top
Flat
Halfway Wash
Virgin River
Mesquite
15
Pah Rah Parcel
Toquop Parcels
Area Locations
N
0 6250 12500 18750 Feet
Source:
1:100,000 Vector Linework - BLM Nevada,
Legend
Wellfield
Access Road
Water Pipeline
Toquop Energy Project
Alternative 1
Map 2-2
CH2MHILL


H:\projects\toquop-EIS\Revised_Figures-1-27-2003\Report-figs.apr (Map 2-3_layout)
Note:
This alternative also includes a land exchange between the Power Plant section and a section (T20N, R23E, Section 9) located in the Pah Rah range in northwestern Nevada.
R67E
R68E
R69E
R70E
R71E
T8S
T9S
T8 1/2S
T10S
T10 1/2S
T11S
T12S
T13S
Alternative Plant Site (Section 4)
Desert
Tule
Wash
Garden
Jumbled Mtn
Hills
Springs
Toquop Gap
Toquop Wash
Mormon Mountains
Mormon
East
Mountains
Existing Electrical Transmission Line
Existing Natural Gas Line and Electrical Transmission Lines
Halfway Wash
Mesa
Top
Flat
Mesquite
Virgin River
UTAH
NEVADA
ARIZONA
LINCOLN COUNTY
CLARK COUNTY
15
Pah Rah Parcel
Toquop Parcels
Area Locations
N
0 6250 12500 18750 Feet
Source:
1:100,000 Vector Linework - BLM Nevada,
Legend
Wellfield
Access Road
Gas Pipeline and Transmission Line
Toquop Energy Project
Alternative 2
Map 2-3
CH2MHILL

A proposed land disposal is part of the Proposed Action and action alternatives being addressed in this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*. To proceed with the land exchange or sale, the public land to be disposed of must be identified in the Caliente MFP as being suitable for disposal. It has been determined that an environmental analysis is needed in the Caliente MFP for the 640 acres of public land that have been identified for disposal under the Proposed Action or action alternatives. Therefore, this document contains a focused *Proposed Toquop Land Disposal Amendment to the Caliente MFP* that addresses the proposed land disposal. The Pah Rah section of land to be acquired already meets the criteria for land acquisition in the Lahonton RMP, which is contained within the Consolidated RMP developed and administered by the BLM's Carson City Field Office. Therefore, no amendments to those RMPs are needed. If a land exchange could not be completed, the project might optionally proceed by building the power plant on public land with the issuance of appropriate ROWs from the BLM, and no amendment required for the Caliente MFP.

Alternative 3 (air-cooled power plant) was added in response to comments received on the DEIS and is evaluated in this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project.*

2.2 Proposed Action

2.2.1 Description of BLM Actions

BLM actions that could occur under the Proposed Action include issuing ROWs necessary for project construction and operation, proceeding with this *Proposed Toquop Land Disposal Amendment to the Caliente MFP*, and completing the Pah Rah/Toquop land exchange. These actions are briefly described in the following text.

2.2.1.1 ROWs

In lieu of or in advance of the land disposal for the Toquop Parcel, the BLM could issue ROWs necessary for the construction and operation of the Toquop Energy Project and related facilities. ROWs would be needed to construct and operate the water-cooled power plant prior to or in lieu of formal execution of the Pah Rah/Toquop land exchange; drill deep ground water wells in the Tule Desert to provide water for the power plant; install a water pipeline and buried electric distribution power lines for the well pumps from the wellfield to the power plant; provide an access corridor from the power plant to the wellfield for maintenance activities; and provide an access road from existing roads to the power plant. ROWs would be required from the BLM that cover a larger footprint initially to accommodate construction activities that include drilling, trenching, paving, and material/equipment staging. Permanent ROWs would be necessary for the long-term operation and maintenance of all facilities located on BLM-managed public land. ROW grants would include strict liability clauses regarding any environmental damages from releases of hazardous materials.

2.2.1.2 Proposed Toquop Land Disposal Amendment to the Caliente MFP

The BLM could proceed with this *Proposed Toquop Land Disposal Amendment to the Caliente MFP* in order

to identify lands as being suitable for disposal (under Section 203 or 206 of FLPMA) for the Proposed Action. *Section 1.6, Management Framework Plan Amendment Process Overview*, of this document describes the basic steps in the planning process that are used to amend management framework plans. These steps are being carried out as part of this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project.*

2.2.1.3 Pah Rah/Toquop Land Exchange

The BLM could approve the Pah Rah/ Toquop land exchange with NLRC following adoption of this *Proposed Toquop Land Disposal Amendment to the Caliente MFP,* Toquop Energy would then acquire the proposed exchanged parcel, which would serve as the power plant site under the Proposed Action, from NLRC. The Pah Rah/Toquop land exchange is described in *Section 1.4, Background; Section 2.1, Introduction;* and *Section 2.2.2.2, Land Exchange*, of this document.

2.2.2 Description of Project Area, Power Plant Site, and Land Exchange

2.2.2.1 Project Area

Map 2-1 depicts the project area and locations of prominent project features associated with the Proposed Action. The project would be located primarily in Lincoln County, Nevada, but portions of some project features, such as the access road to the power plant site, would be in Clark County, Nevada. Prominent landmarks in the project area include Interstate 15 (I-15) and the Virgin River to the south, the Tule Desert and Tule Spring Hills to the north, and the East Mormon Mountains west of the power plant site (see Map 2-1).

2.2.2.2 Power Plant Site

The Proposed Action power plant site is in T11S, R69E, Section 36, in Lincoln County, Nevada, on public lands administered by the Ely Field Office of the BLM. Toquop Energy would acquire the power plant site from NLRC following completion of the Pah Rah/Toquop land exchange between the BLM and NLRC. The site is approximately 12 miles north-northwest of Mesquite, 70 miles northeast of Las Vegas, 6 miles north of the Lincoln County/Clark County line, and 10 miles west of the Nevada/Utah/Arizona border. Map 2-1 shows the power plant site and associated project features, including the wellfield, water pipeline, and access road. Map 2-4 shows the detailed location of the proposed power plant site.

The 1-mile-square power plant site contains 640 acres of uninhabited public land near the Toquop Wash on the northern boundary of the Mojave Desert. The site is relatively flat, with a 2 percent slope from northwest to southeast, and varies in elevation from 2465 to 2590 feet above mean sea level. The entire site is within the Virgin River Hydrographic Basin (#222). The South Fork Toquop Wash runs within 3/4 mile of the site to the north, and the main stem Toquop Wash runs north/south approximately 1/4 mile east of the site. The Toquop Wash system receives runoff from the Mormon and East Mormon mountains located west and northwest of the site and drains to the Virgin River. The Kern River Natural Gas Pipeline, Navajo-McCullough Electric Transmission Line, and Red Butte-Harry Allen Electric Transmission Line cross the southeast corner of the site (see Map 2-1).

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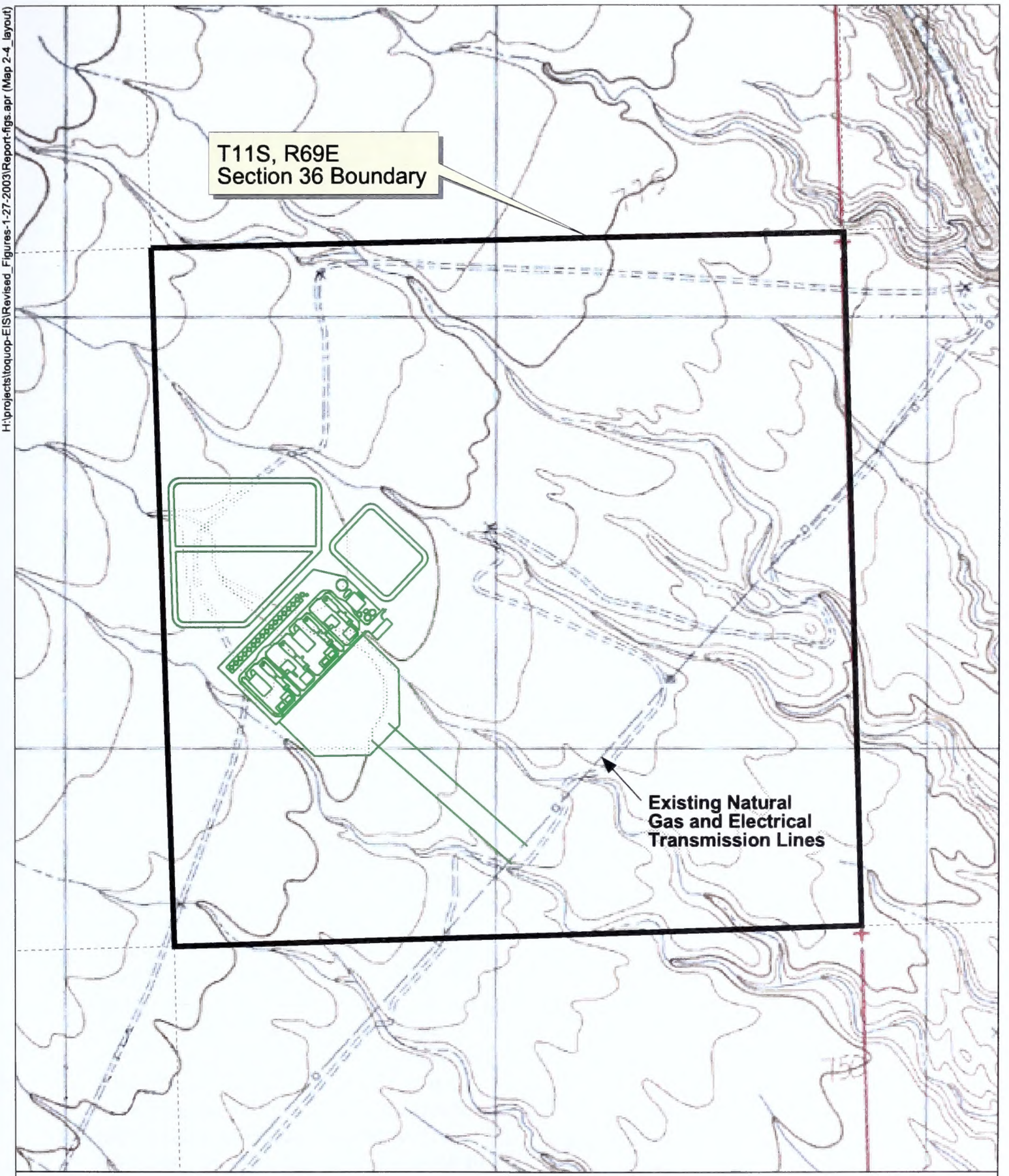


N

0 500 1000 Feet

Source:
Maptech 1:24,000 Scanned Topo Maps

Toquop Energy Project Proposed Plant Site
Proposed Action and Alternative 1
(Section 36)

Map 2-4

CH2MHILL

2.2.2.3 Land Exchange

This land exchange under the Proposed Action will exchange approximately 640 acres of private land owned by the NLRC in the Pah Rah Range in Washoe County for a similarly valued, BLM-managed parcel of public land near the Toquop Wash in Lincoln County (see *Section 2.2.2.3, Power Plant Site*).

The private parcel of land is owned by NLRC and is located on a mesa at the southern end of the Pah Rah Range in T20N, R23E, Section 9. The Pah Rah parcel consists primarily of open, uninhabited land and is approximately 10 miles west of Fernley and 25 miles east of Reno. Maps 1-1 and 1-2 show the locations of the Toquop Wash and Pah Rah parcels within Nevada. This exchange will be completed as an equal-valued transaction based upon market values determined through federally approved appraisals.

For many reasons, it was determined that more benefit would be derived from an exchange of these parcels than by merely providing BLM ROW grants for the proposed power plant site and appurtenant facilities. The BLM Carson City Field Office desires to acquire this "checkerboard" land to address Washoe County's urban interface/open space issues by providing additional access to public land and resources, while providing watershed and resource (cultural and wildlife [sage grouse habitat]) protection from private development. Development would require new roads into this roadless parcel and would jeopardize these resources. On the other hand, the BLM Ely Field Office wishes to dispose of selected public land to assist county and local governments with community expansion/ economic development opportunities.

All surface and mineral rights and interests would remain with the respective exchanged parcels and transfer to the new owners. No water rights are associated with either parcel and the existing utility rights-of-way on the Toquop parcel would be converted to "easements in perpetuity" should a land patent be issued. Public access would be maintained through the Toquop parcel on an existing access road or on approved access alignments that do not adversely affect the existing utility facilities.

Should this exchange be approved, the Pah Rah parcel would be managed by the BLM as provided in the Carson City Field Office CRMP, which states, "Initiate land exchanges with the Southern Pacific Railroad...to block in lands in the ...Olinghouse Allotment(s)." This acquisition proposal also meets all the following Southern Washoe County Urban Interface Plan Amendment criteria for the Pah Rah area:

- Facilitate access to public lands and resources
- Provide resource protection
- Facilitate implementation of the CRMP
- Provide for a more manageable land ownership pattern
- Maintain or enhance public recreational uses and open space values

Washoe County supports this proposed exchange for the public benefits stated above, interests, and protection provided by BLM land use plans. Lincoln County supports this proposed exchange for the opportunities mentioned previously and

improved tax base that would be afforded to the county, which is currently comprised of more than 98 percent federally administered lands. Private development, such as a power plant, would provide additional employment and associated economic opportunities in the surrounding area. Additional taxes afforded by this development would provide revenues to maintain existing public programs and to initiate new programs/services not financially viable at the present time.

2.2.3 Description of Project Features and Operation

2.2.3.1 General

Project features, their operation, and associated actions of the Proposed Action include the following primary elements:

- Issue ROWs by the BLM for constructing and operating the power plant and all related facilities
- *Proposed Toquop Land Disposal Amendment to the Caliente MFP* to identify the southern plant site as suitable for disposal through sale or exchange
- Complete a land exchange between the BLM and NLRC to place the proposed plant site into private ownership
- Construct and operate a 1,100-MW (maximum) combined cycle, natural gas-fired, water-cooled electric generating plant, with connections to a natural gas pipeline and electric transmission lines
- Drill up to an estimated 15 wells in the Tule Desert Basin (Hydrographic Basin #221) over the life of the project sufficient to produce an annual average flow of 3,800 gallons per minute (gpm) (7,100 gpm peak daily) of water for the power plant. It is estimated that the power plant could use up to 7,000 acre-feet of water per year.
- Construct and operate a 12.5-mile-long, 24-inch-diameter buried water pipeline extending from the wellfield in the Tule Desert, through Toquop Gap, to the power plant near the Toquop Wash
- Construct and operate a manifold collection system to interconnect the water output from the wellfield to a pressure-regulating water tank
- Construct and operate a pressure-regulating water tank located near the wellfield before the water pipeline to the power plant
- Construct and operate buried electric distribution power lines from the power plant to the well pumps
- Pave to a width of 24 feet and straightening sections of 14.4 miles of an existing dirt and gravel road (locally known as the Halfway Wash Road and utility corridor road) to produce an access road extending from I-15 to the plant site
- Provide a 12.5-mile-long access right-of-way along an existing dirt and gravel road for maintenance activities between the power plant and the ground water wellfield

The following sections discuss the project features and their operation, including the power plant facilities, road access and transportation, ground water wellfield, and water pipeline. BLM actions associated with these features, which include issuing ROWs, amending the Caliente MFP, and

facilitating the Pah Rah/Toquop land exchange were described in *Section 2.2.1, Description of BLM Actions.*

2.2.3.2 Power Plant Facilities

This section briefly describes how electric power would be produced at the water-cooled power plant. This discussion is intended to familiarize readers with basic concepts and terminology and to promote a better understanding of topics discussed later in this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project.*

Electricity can be generated commercially in several ways, but the common element is the turning of a generator. The source of power that turns the generator distinguishes the different types of power plants. Typical installations use either a diesel engine, a combustion turbine, and/or a steam turbine.

The proposed power plant employs combined cycle technology, which would use combustion turbine generators in series with heat recovery steam generators and steam turbine generators. The exhaust heat from the combustion turbine generator is used in the heat recovery steam generator to produce steam. That steam would drive the steam turbine generator. Use of the original gas fuel energy for the combustion turbine generator and then using the exhaust heat from the combustion turbine generator (which otherwise would go to waste) to produce steam for the steam turbine generator increases the plant's overall efficiency when compared with a combustion turbine generator or steam turbine generator operating alone. Figure 2-1 presents a conceptual rendering of the proposed water-cooled power plant.

The combustion turbine generators would be fueled by natural gas from the 36-inch-diameter Kern River Gas Pipeline, which passes directly through the southeast corner of the Toquop Wash plant site. This pipeline became operational in 1992 and transports natural gas from southwestern Wyoming to southern and south-central California. A tap, meter station, and connective pipeline would be required as part of the project to provide natural gas to the plant. The pipeline meter and tap would be at the main line and would be accomplished without interruption to other natural gas customers.

The power plant would use four combustion turbine generators, four heat recovery steam generators with duct burners, and up to four steam turbine generators. In addition, two natural gas-fired auxiliary boilers would be used to provide startup steam to the steam turbines. The steam from the auxiliary boilers would not be used to generate electricity. Each combustion turbine generator would be composed of a combustion turbine fueled by natural gas, which would be connected to and drive a three-phase, alternating current generator. The hot exhaust of each combustion turbine generator enters an attached heat recovery steam generator. Each heat recovery steam generator is a large, three-pressure heat exchanger/steam generator that would use the hot combustion turbine generator exhaust gas to heat water into high-pressure steam. Natural gas burning duct burners would be included in the heat recovery steam generator to augment steam production. The exhaust gas would enter the heat recovery steam generator at approximately 1,100 degrees Fahrenheit and pass through multiple banks of water-filled tubes, heating the water into low-, intermediate-, and high-pressure steam. The exhaust gas would pass through a

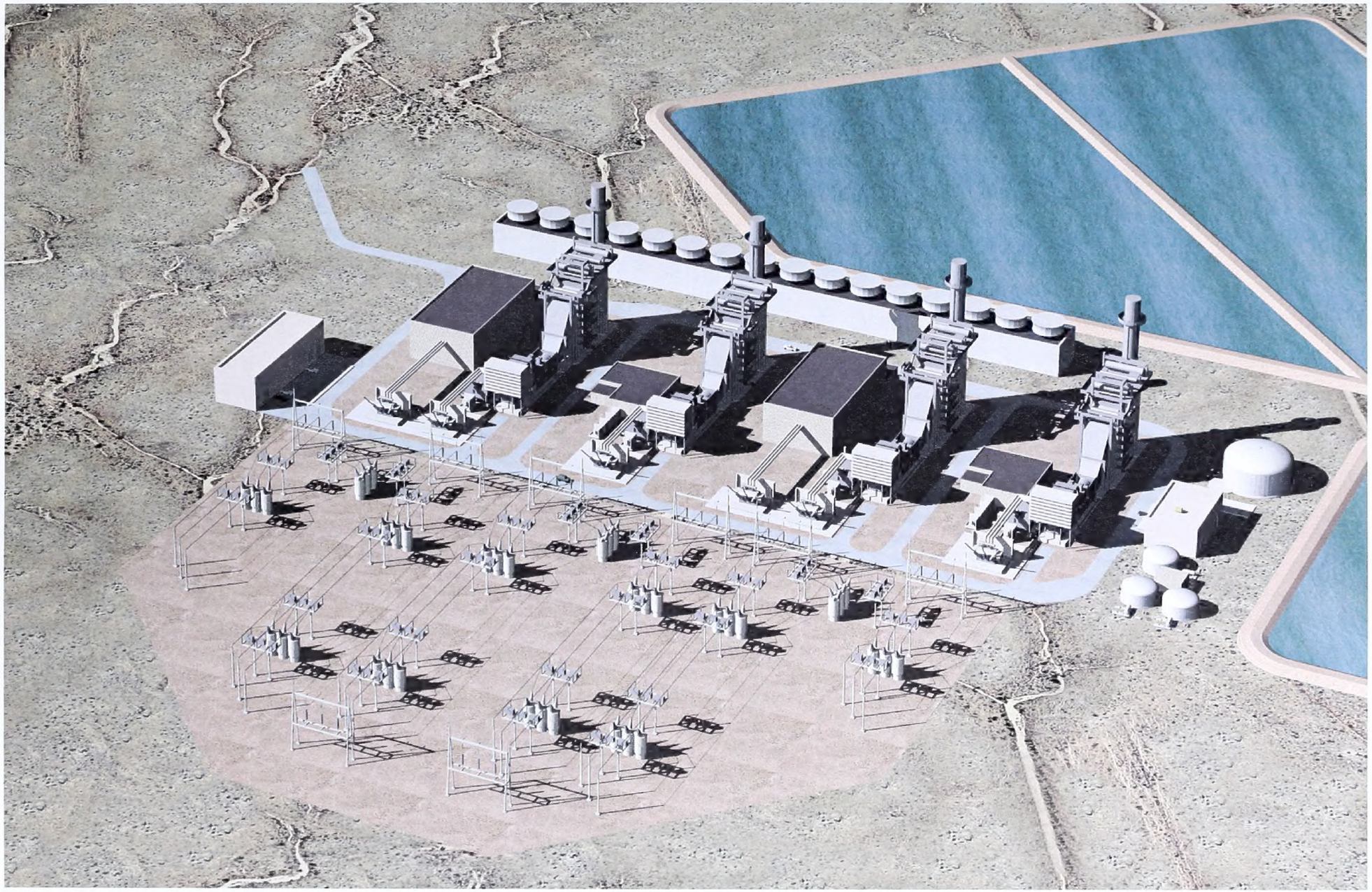
series of emissions control systems and would be vented through an elevated exhaust stack that is 180 feet high. The combined cycle combustion turbines would be dry, low-nitrogen oxide, low-carbon monoxide combustors used in conjunction with selective catalytic reduction in the heat recovery steam generator to control nitrogen oxide emissions.

The steam produced in the heat recovery steam generators would be used to power steam turbines, which would be connected to three-phase electrical generators. Duct firing within the heat recovery steam generators would increase steam production to increase the power production by the steam turbine. Given optimal conditions (operation of duct burners at designed maximum capacity), the energy center could produce up to approximately 1,100 MW. The electric power would be transmitted from the power plant switchyard to the Navajo-McCullough Electric Transmission Line and the Red Butte-Harry Allen Transmission Line, which cross the southeast corner of the plant site. This transmission line is northwest of and parallel to the Kern River Gas Pipeline corridor. Toquop Energy is pursuing a contract to interconnect with the transmission lines. Adequate capacity is available on the lines to transmit Toquop-produced energy.

After steam passes through the steam turbine, in this water-cooled plant, it would be condensed to liquid in the condenser and pumped back to the heat recovery steam generator to repeat the cycle. The condenser would be a large tube-and-shell heat exchanger that operates at a vacuum on the shell (steam) side. Cooling water would flow from the cooling tower through the condenser tubes, pick up residual heat from the steam, and return to the cooling tower. The cooling tower would be a direct-contact heat exchanger in which the cooling water would be sprayed directly into a moving air stream, evaporating a portion of the water to carry heat away from the condenser. In this process, the same water would be used for several cycles. As the well water circulates and evaporates in the cooling tower, the level of dissolved solids in the water would concentrate. A portion of the circulating water would be "blown down to waste" to remove dissolved solids from the circulating water and prevent scale formation on process heat transfer surfaces. This cooling tower blowdown would consist primarily of high concentrations of dissolved solids that occur naturally in the well water used as makeup to the cooling water system. Figure 2-2 shows a schematic of this combined cycle electric power production process.

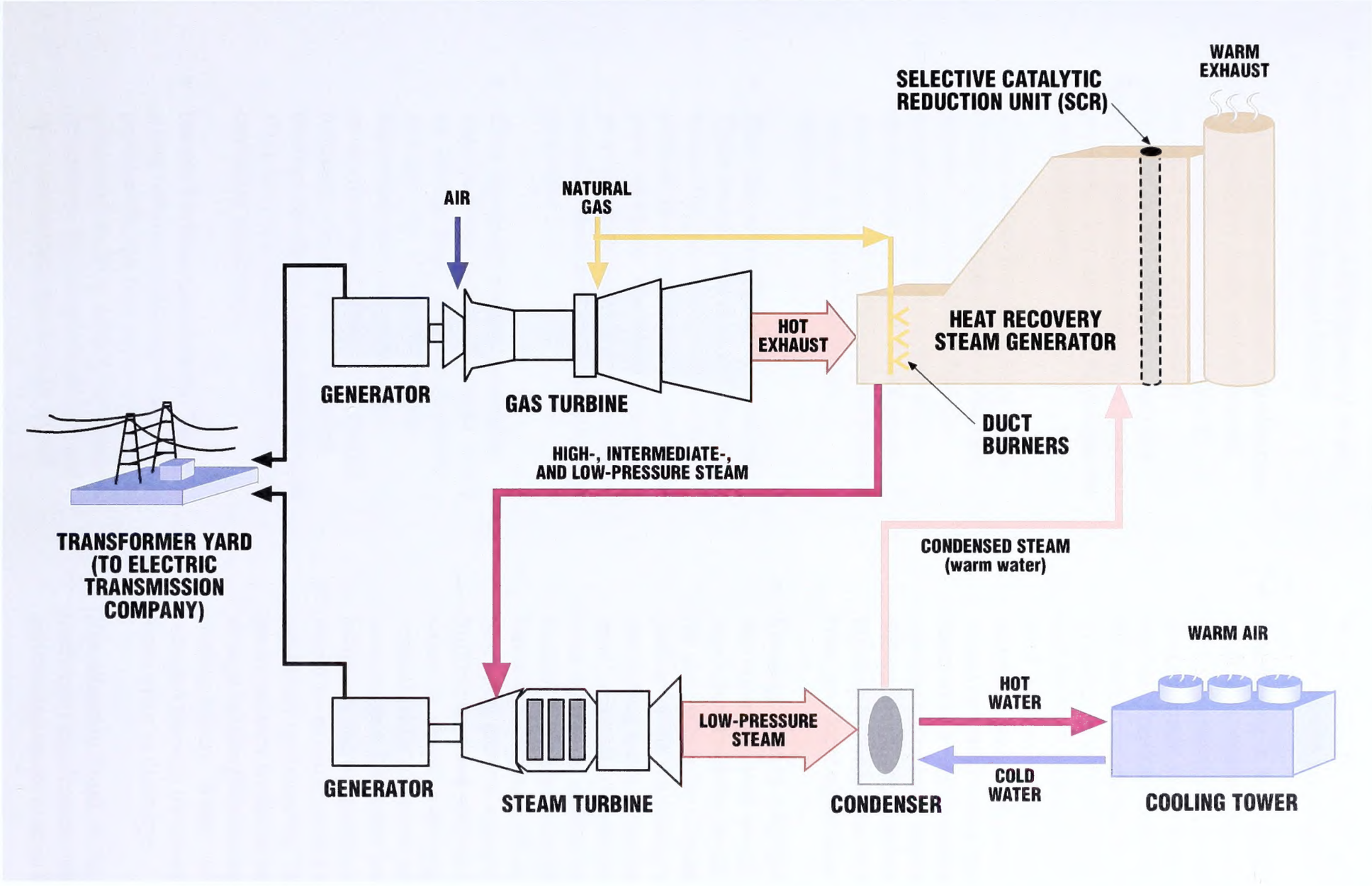
While this would be a 1,100-MW plant (maximum), it is important to note that two-thirds of the power generated would come from the combustion turbines while one-third would come from the steam turbines. Therefore, water use and consumption would be equivalent to that of a 360-MW steam plant.

Blowdown from the steam cycle would go to a brine concentrator and then be further managed onsite using a geomembrane double-lined equalization pond and double-lined evaporation pond. Each liner would be 60 mils thick. The onsite equalization pond would be managed to keep the water chemistry balanced for use in the cooling system. No wastewater would be discharged from the ponds to any surface water or offsite treatment facilities. Solids filtered or settled from the wastewater in the recycle process would be removed from



Toquop Energy Project
Water-Cooled Power Plant
Conceptual Rendering

Figure 2-1



Combined Cycle Electric Power Production Process

Figure 2-2

the site regularly, and disposed of at an approved offsite disposal facility.

The power plant, switchyard, equalization and evaporation ponds, and associated facilities would cover approximately 100 acres. This acreage would be surrounded by an 8-foot-high chain link fence that meets desert tortoise exclusion requirements. The fence would enclose the following structures:

- **Combustion Turbine Generators.** These natural gas-fired combustion turbines would each be directly connected to an 18-kilovolt (kV), three-phase generator. Combustion gases from the turbines would exhaust into the heat recovery steam generators.

- **Heat Recovery Steam Generators.** These steam generators would use the heat of the gas turbine exhaust to produce low-, intermediate-, and high-pressure steam. The steam from each pair of heat recovery steam generators would be used to drive a steam turbine generator.

- **Heat Recovery Steam Generator Stacks.** These cylindrical stacks would be 180 feet high, 18 feet in diameter, and carry the 170- to 195-degree Fahrenheit heat recovery steam generator exhaust above surrounding buildings. An air quality sampling platform would be constructed on each stack for stack testing and combustion emissions equipment.

- **Steam Turbine Generators.** These steam turbines would use steam produced by the heat recovery steam generators to drive 18-kV, three-phase generators. The steam would exhaust into a condenser, return to its liquid state, and be recycled back into the heat recovery steam generators.

- **Condenser.** A large shell-and-tube heat exchanger would attach to the steam turbine exhaust side, which would condense exhaust steam from the steam turbine. The condensate would be recovered and chemically conditioned to minimize corrosion and scale formation for reuse in the system. Chemicals used (such as oxygen scavenger, amine solutions, and phosphate solutions) would be stored within spill containment areas in self-contained storage systems called totes (typical volume of 400 gallons) in the water treatment building in compliance with federal, state, and local regulations.

- **Cooling Towers.** Mechanical-draft wet cooling towers would be used to reject heat from the steam condenser to the atmosphere by evaporating a portion of the circulating water. The circulating water would be treated with small amounts of chemicals such as scale inhibitors, sulfuric acid, and sodium hypochlorite to minimize scale formation, maintain pH, and inhibit biological growth, respectively. Sulfuric acid and sodium hypochlorite would be stored in aboveground vertical tanks within secondary containment. The other lesser inhibitors and treatment chemicals would be stored in totes located within secondary containment. The storage for these totes would be inside the storage building located near the cooling towers. Water would be recycled through the towers at least ten times prior to discharge.

- **Equalization Pond.** A 5-acre uncovered equalization pond would be constructed onsite to keep the water

chemistry balanced for use in the cooling system. This pond would be sealed with a 60-mil-thick double liner.

- **Evaporation Pond.** A 20-acre uncovered evaporation pond would be constructed onsite to handle the disposal of all wastewater. The pond would be sealed with a double liner. Each liner would be 60 mils thick. No wastewater would be discharged from the facility to any surface water or offsite treatment facilities, which would be consistent with state requirements for a ground water discharge permit. Dry solids from water treatment would be disposed of offsite at a licensed landfill.

- **Electrical Switchyard.** Electricity generated by each of the four combustion turbine generators and the steam turbine generators would be increased from 18 kV to 500 kV and transferred to the Navajo-McCullough Electric Transmission Line located on the plant site. Electricity produced at the power plant would be sold to the wholesale market through the Navajo-McCullough Electric Transmission Line (Western Transmission System). The Nevada-McCullough Transmission Line has adequate capacity to transmit the electricity that would be generated by the Proposed Action. A portion of the electricity could be stepped up to 345 kV and transferred to the existing Red Butte-Harry Allen 345-kV line in the utility corridor. This line, owned by Nevada Power, has sufficient capacity to transmit the electricity that would be generated by the Proposed Action.

It is anticipated that hazardous materials as defined in Appendix B will be used, transported, or stored during the construction and operation of the power plant.

The Toquop Energy Project is seeking approvals to operate up to 24 hours per day, 365 days per year, and would require approximately 25 full-time employees.

2.2.3.3 Road Access and Transportation

The power plant site would be accessible from I-15 via the East Mesa Interchange, which is 13 miles west of Mesquite (see Map 2-1). Approximately 14.4 miles of an existing dirt and gravel road (Halfway Wash/utility corridor road) would be paved to a width of 24 feet, and some sections would be straightened to produce an access road extending from I-15 to the plant site. Table 2-1 summarizes acres of land in Clark County and Lincoln County that would be temporarily disturbed and reclaimed or permanently disturbed by the construction upgrades and operation of the existing access road.

The construction right-of-way for this 14.4-mile-long access road (5.2 miles in Clark County and 9.2 miles in Lincoln County) would be quite variable in width because of variation in terrain and would occupy 246 acres. This access road presently occupies 30 acres. The net new construction right-of-way disturbance from the widened access road would be 216 acres.

Staging areas required for road construction would total an additional 20 acres (all in Lincoln County) and would be reclaimed. The long-term right-of-way for the access road would occupy 138 acres. The net new permanent impacts (which include the road surface and adjacent road shoulders) within the long-term right-of-way would be 65 acres, 23 acres of which would be in Clark County and 42 acres of which would be in

TABLE 2-1
Land in Clark County and Lincoln County Affected by the Access Road

	Clark County (acres)	Lincoln County (acres)	Total (acres)
Construction right-of-way for access road	89	157	246
Existing access road	10	20	30
Net new construction right-of-way disturbance	79[a]	137[b]	216
Staging areas	0	20[a]	20
Long-term right-of-way for access road	50	88	138
Net new permanent disturbance within long-term right-of-way[c]	23	42	65

[a] All within the Mormon Mesa ACEC
[b] 123 acres within the Mormon Mesa ACEC
[c] Except for these acres, all other lands disturbed as a result of project activities in the construction right-of-way, permanent right-of-way, and staging areas would be reclaimed.

Lincoln County. Except for these 65 acres, all other lands temporarily disturbed during road construction would be reclaimed. Road-related temporary disturbances on lands administered by the Las Vegas and Ely Field Offices of the BLM would be restored according to restoration plan requirements for each of those offices, which would be addressed in the POD. No new roads would be required for site access.

This low-speed but serviceable road is the primary access for maintaining a microwave station, communications equipment optical fiber lines, natural gas pipelines, and electric transmission lines located on the southern end of the East Mormon Mountains. The Proposed Action would use this existing road as the primary site access. This would require that the road be regraded, a suitable base material installed, and then paved for all-weather use. The existing road would require straightening in some locations where it has very-small-radius turns. Some dry washes exist where culverts or other materials would be installed to prevent road damage during periods of excessive runoff. Minor improvements would be required on the frontage road at the I-15 interchange to handle large construction equipment and the largest components of the power plant itself.

The desert tortoise is a federally protected species under the terms of the Endangered Species Act (ESA). Measures to protect desert tortoise and their habitat will be described in the terms and conditions of ROWs issued by the BLM and would be followed during road upgrading and use (see *Section 2.2.5, Best Management Practices and Standard Operating Procedures* and *Appendix A, Measures for Protecting Desert Tortoises and Their Habitat*, for detailed descriptions). In addition, upgrading the road will meet requirements of the Caliente MFP, the Las Vegas RMP, and the POD. These protective measures are especially important because this access road passes through the Mormon Mesa Area of Critical Environmental Concern (ACEC), so designated because of the presence of desert tortoise critical habitat. All but the

northernmost 0.9 mile of the access road is in the Mormon Mesa ACEC (see Table 2-1).

2.2.3.4 Wellfield

Ground water is proposed for use in all power plant operations and for cooling water under the Proposed Action. Approximately 3,800 gallons per minute (gpm) of water would be required to supply the power plant under annual average design operating conditions. Because of higher cooling demands, the average water use during the summer months would be approximately 5,500 gpm (approximately 2,190 acre-feet of water from June through August). The peak daily use of water could require up to 7,100 gpm (31 acre-feet of water per day). It is estimated that the power plant would require up to 7,000 acre-feet of water per year. More than 90 percent of this water (approximately 6,300 acre-feet) would be used by an evaporative cooling tower system. The remainder would be filtered, if necessary, to provide service water, potable water, and water for the demineralized water treatment system. That system would supply the high-purity water needs of the heat recovery steam generators.

The Proposed Action includes the development of a wellfield in the Tule Desert Hydrographic Basin (#221) to supply ground water to the power plant. Although a significant amount of work has been completed to characterize the ground water resources (CH2M HILL, 2002), additional studies are currently underway to determine the exact number and location of these wells. For purposes of analysis in this document, it is assumed that up to 15 deep wells, each with a pump enclosed by a small building, would be required over the life of the project. A manifold system would interconnect the output from each of these wells to a single 24-inch-diameter buried pipeline. That pipeline and buried electrical distribution power lines in the same right-of-way would extend from the Tule Desert to the Toquop Wash plant site approximately 12 miles away.

Although the exact location of each well is not yet known, they would be spatially dispersed in the southern third of the Tule Desert (see Map 2-1). The wells would be located as close as possible (within 300 feet) to one of the several existing dirt roads that crisscross this area. The maximum disturbed surface area for each well would be approximately 1 acre. This would consist of approximately 1/3 acre for the new 300-foot-long access road and pipeline, which would have a 60-foot-wide construction right-of-way, and approximately 2/3 acre for construction activities at the well site. The total area disturbed would range up to 15 acres, depending on how many wells are drilled. Because the collection pipelines and associated electrical service lines would be located in existing roads, no new disturbance would result.

In addition to the wells and manifold system, a raw water storage tank of approximately 500,000 gallons (configuration and color to be determined during final design to blend with background conditions) would be built to maintain constant flow in the pipeline. This storage tank would be located above ground as close as possible to the production well farthest downstream and would feed water by gravity to the power plant. The maximum disturbed area for the storage tank would be 1 acre. An existing 12.5-mile-long road from the power plant site to the wellfield would be used occasionally to provide access for maintenance and monitoring of production wells.

Permanent water rights that would be required to supply up to 7,000 acre-feet of water per year from the Tule Desert wellfield necessary to operate the Toquop Energy Project under the Proposed Action have been jointly applied for by Vidler Water Company, Inc. (a sister company of NLRC) and Lincoln County. Toquop Energy would lease and use these water rights for the 42-year life of the project. The Nevada State Engineer (Ruling Number 5181) has approved 2,100 acre-feet of water per year of the Vidler Water Company - Lincoln County water right applications. Vidler Water Company - Lincoln County have an application for additional water allocations adequate to operate the power plant. The application is being held for action pending results of additional hydrologic studies requested by the Nevada State Engineer.

As part of the process in which these water rights were granted, the installation of a monitoring well is required downgradient of the southernmost production well. This monitoring well along with other wells in the wellfield would be used to assess effects of withdrawal from the deep aquifer. The maximum disturbed surface area for this specific downgradient well would be approximately 1 acre. Ground water monitoring is discussed further in Section 4.4.1.1.2.

2.2.3.5 Water Pipeline

Ground water withdrawn from the Tule Desert wellfield would be pumped and gravity-fed through a 24-inch-diameter ductile iron or steel pipeline 12.5 miles to the power plant site. Pipeline capacity would only be sufficient for the Toquop Energy Project. The pipeline route does not follow existing roads except near the wellfield. The pipeline would run south-southwest for approximately 5 miles, crossing Sam's Camp Wash west of the East Mormon Mountains, and then proceed east approximately 3/4 mile through the Toquop Gap (Map 2-1). It would then turn south-southeast for approximately 6 miles directly to the plant site. The line would cross the South Fork Toquop Wash 1-1/2 miles north of the proposed plant site. The wash is approximately 80 feet deep at the proposed pipeline crossing point.

The pipeline would be buried deep, well below potential streambed scour, erosion, and exposure, and away from potential lateral bank migration. The potential for both scour and lateral bank migration would be studied further during final design to determine burial depth necessary to protect the pipeline from exposure and failure during floods. Open-cut construction techniques would probably preclude reestablishing the vertical wall in some sections of the canyon.

Steel pipe, if used, would be lined with cement mortar, have a dielectric coating, and have a cement-mortar coating (rock shield) on the exterior of the pipe. The type of dielectric coating would depend on the corrosivity of the soil and would be determined during final design. Ductile iron pipe, if used, would also be cement-mortar lined, with an asphaltic 1-mil-thick exterior coating, and a polyethylene encasement in areas of corrosive soil, also to be determined during final design.

The temporary right-of-way for pipeline construction would be 60 feet wide to allow for soil disturbance during pipeline trenching, laying, backfilling operations, and laying of the electrical lines to the wellfield. Staging areas during pipeline construction would consist of a 3-acre area at the northern end of the pipeline in Section 4; a 3-acre area midway along the

pipeline just east of the Toquop Gap; and 3 acres at the power plant site. Because the acreage for the third area is included in the total for the power plant site, the water pipeline staging areas are considered to total 6 acres. After construction, a long-term 30-foot-wide right-of-way would be sufficient for maintenance activities. The construction and long-term rights-of-way for the 12.5-mile-long water pipeline would include approximately 90 acres and 45 acres, respectively. All disturbed lands within these rights-of-way and staging areas would be reclaimed. Maintenance would include periodic inspection of the entire route and routine exercising of all valves in the system. It is anticipated that this activity could be supported using low-impact all-terrain vehicles (ATVs). Should major maintenance or repair be required, most equipment could be supplied by helicopter or four-wheel drive vehicles to eliminate the need for a permanent access road. Vegetation would be reestablished in the disturbed surface areas over time according to measures described in *Section 2.2.5, Best Management Practices and Standard Operating Procedures.* Signs would be posted to discourage recreational use of this right-of-way and to warn of electrical hazards in the event of excavation.

2.2.4 Construction Activities

The construction phase for the access road, power plant, and water pipeline would start between mid-2003 and the end of 2004. The exact start of construction will be refined as part of the overall development process. Construction would last for approximately 26 months. The average construction crew is estimated to be approximately 500 people. Normal construction hours would be from 6 a.m. to 3 p.m. on weekdays; however, some activities would require extended operation hours for scheduling constraints, to maintain structural integrity of concrete pours, or for other time-sensitive matters.

Construction activities would include the following four phases:

- Site clearing and preparation
- Foundation construction
- Building and equipment installation
- Site cleanup and project start-up

2.2.4.1 Site Clearing and Preparation

Site clearing and preparation would require heavy, diesel-powered earthmoving equipment including bulldozers, scrapers, dump trucks, and front-end loaders. Site clearing and preparation would occur at all locations where equipment would be constructed or installed and along the access road to be widened. Some blasting is anticipated, depending on site-specific conditions at the various construction sites and the results of geotechnical field investigations during final design. The amount of cut and fill would be estimated during detailed final design, pending approval of the ROWs and acquisition of required permits. Table 2-2 presents an estimate of the number, type, and length of use of construction equipment.

The size of the area used for borrow material would depend on the suitability of available materials and be determined during final design. However, all borrow material would come from areas that would be disturbed during construction of the power plant and ponds. If additional borrow material is needed, it would come from an existing offsite commercial facility. No new borrow areas would be constructed for this project.

TABLE 2-2
Time and Equipment Construction Requirements for the Proposed Action

Component	Equipment	Capacity (horsepower)	Fuel Type	Number of Units	Use Days (per unit)	Total Use (in days)
Power Plant (730 days)						
	Excavator/Trackhoe	250	Diesel	4	50	200
	D10 bulldozer	400	Diesel	1	175	175
	Front-end loader	200	Diesel	2	730	1,460
	Backhoe	200	Diesel	3	120	360
	Crane	225	Diesel	6	135	810
	Water truck	300	Diesel	2	250	500
	Concrete truck (20,000 cubic yards; 2,000 trips)	325	Diesel	12	80	960
	Dump truck	250	Diesel	3	80	240
	Material delivery truck (3,000 trips)	250	Diesel	—	—	1,500
	Concrete pump truck	400	Diesel	1	120	120
	Loader	100	Diesel	1	290	290
	Fork lift truck	100	Diesel	6	235	1,410
	Electric generator	5	Gasoline	10	200	2,000
	Pick-up truck	150	Gasoline	3	730	2,190
	Welder	250 amps	Electric	15	60	900
Access Road Construction (180 days)						
	D8 bulldozer	400	Diesel	2	120	240
	D6 bulldozer	300	Diesel	2	120	240
	Scraper	300	Diesel	4	120	480
	Water truck	250	Diesel	2	150	300
	Pick-up truck	200	Diesel	2	150	300
	Asphalt trucks	250	Diesel	6	60	360
Water Pipeline Construction (90 days)						
	Trackhoe	300	Diesel	2	80	160
	D6 bulldozer	300	Diesel	2	80	160
	Pick-up truck	150	Diesel	2	90	180
	Pipe delivery truck	250	Diesel	1	80	80

During construction, up to 125,000 gallons (0.4 acre-foot) of water would be used daily. This water would be acquired from the permanent ground water system for the project. Water uses during the construction phase would include dust control, concrete curing, and hydrostatic testing of completed pipelines and heat recovery steam generators. Only bottled water would be used for human consumption.

During construction, diesel-powered generators would produce the required electricity. Generators would be connected to an onsite transformer for distribution to electrically powered construction tools and equipment. Communications during construction would be accomplished via a microwave tower that would be constructed on the power plant site.

An estimated 449 acres would be disturbed and/or included in construction rights-of-way under the Proposed Action. All but 79 acres would be in Lincoln County. This total would consist of 100 acres that would be fenced and enclose the power plant, switchyard, equalization and evaporation ponds, associated facilities, and a lay-down area; 216 acres of new disturbance for the access road (79 acres in Clark County and 137 acres in Lincoln County); up to 15 acres for the wellfield; 1 acre for the monitoring well; 1 acre for the storage tank; 90 acres for the water pipeline; and 26 acres for staging areas (20 acres for the access road and 6 acres for the water pipeline). Disturbed lands within rights-of-way would be reclaimed as a component of the Proposed Action according to measures described in *Section 2.2.5, Best Management Practices and Standard Operating Procedures.* Long-term disturbances would total 182 acres and consist of 100 acres for the fenced power plant site; 17 acres for the wellfield, monitoring well, and storage tank; and 65 acres of net new disturbance for the access road (23 acres in Clark County and 42 acres in Lincoln County). Other lands disturbed during construction along the access road, in the pipeline right-of-way, and at staging areas (267 acres) would be reclaimed.

2.2.4.2 Foundation Construction

Foundation construction would involve concrete handling equipment such as concrete trucks, mixers, vibrators, and pumps. Some earth-moving equipment also would be required to backfill the foundations. Any blasting activities that may be required would occur for as short a duration as possible and would be limited to daytime.

2.2.4.3 Building and Equipment Installation

Building and equipment installation would involve mobile cranes, equipment delivery, impact wrenches, grinders, and air compressors. Activities would be restricted to the power plant site, except for the water pipeline and the water storage tank to be constructed in the Tule Desert and the widening of the access road.

2.2.4.4 Site Cleanup and Facility Start-Up

Site cleanup and power plant start-up would generally require minimum amounts of heavy machinery. It would primarily include flushing pipes, blowing out steam lines, and testing equipment and controls.

2.2.5 Best Management Practices and Standard Operating Procedures

Activities under the Proposed Action would consist of two sets of actions that are a specifically directed and an integral part of the Proposed Action. The first set of actions would be to comply with the terms and conditions of all ROWs issued by the BLM. The second set of actions would be to follow best management practices (BMPs) and standard operating procedures (SOPs) typically associated with the construction, operation, and maintenance of power plants, wellfields, pipelines, other utility corridors, and related facilities in this region of the western United States. These BMPs and SOPs would be followed to avoid or minimize the potential for adverse environmental effects resulting from project-related activities. Special emphasis would be placed on protecting desert tortoise and their habitat. *Appendix A* lists management prescriptions for desert tortoise habitat that are consistent with the Desert Tortoise Recovery Plan, relevant HCPs, and other identified management documents, and which would be followed during project construction, operation, and maintenance activities. *Appendix B, Standard Construction and Operation Procedures*, describes BMPs and SOPs for the following activities:

- Landscape preservation and impact avoidance
- Erosion and sediment control
- Pipeline and utility corridor construction
- Biological resources
- Cultural resources
- Site restoration and revegetation
- Visual resources
- Water pollution prevention and monitoring
- Transportation
- Noise and air pollution prevention
- Hazardous material storage, handling, and disposal, and safety measures

The final POD will detail the methods and procedures to be used in the construction of the power plant, access road, and ancillary facilities. The POD will incorporate site-specific stipulations, terms, and conditions in order to satisfy all project-related construction requirements, as well as operational, maintenance, and restoration requirements associated with lands administered by the Ely and Las Vegas Field Offices of the BLM where project features would be located.

Appendix C, Cultural Resources Programmatic Agreement, contains the Cultural Resources Programmatic Agreement with stipulations to ensure that historic and prehistoric properties will be treated to avoid or mitigate project-related effects to the extent practical and to satisfy BLM Section 106 responsibilities. Mitigation measures specific to various resources present in the project area are referenced in *Chapter 4, Environmental Consequences*.

2.2.6 Decommissioning

The proposed power plant would have a life expectancy of 42 years, including construction. At the end of its useful life, the power plant would be decommissioned. At decommissioning, all

structures and equipment at the site would be dismantled and removed. The onsite evaporation and equalization ponds would be excavated to remove sediment. The excavated material would be tested and disposed of at an approved offsite disposal facility. All pond liners would be removed and the land surface would be regraded. The water pipeline and electric distribution line would be closed and left in place. All wells would be decommissioned and abandoned in accordance with state regulations. Use of the water rights by Lincoln County after the 42-year project life is unknown.

2.3 Alternative 1

2.3.1 Description of BLM Actions

BLM actions that could occur under Alternative 1 include issuing ROWs necessary for project construction and operation, proceeding with this *Proposed Toquop Land Disposal Amendment to the Caliente MFP*, and completing the Toquop land disposal through sale or exchange. The ROW issued by the BLM for the construction and operation of a water pipeline and buried electric distribution power lines under Alternative 1 would be for an eastern rather than a western alignment. This alternative alignment is depicted in Map 2-2 and described below in *Section 2.3.3.1, Water Pipeline.*

2.3.2 Description of Project Area, Land Disposal, and Power Plant Site

Map 2-2 depicts the project area, land disposal parcel, and power plant site associated with Alternative 1. The water pipeline and buried electric distribution power lines would follow a more easterly alignment under Alternative 1 than under the Proposed Action. The power plant site, located in T11S, R69E, Section 36, in Lincoln County (see Map 2-4), would be available for disposal through sale or exchange.

2.3.3 Description of Project Features and Operation

Project features (see Map 2-2), their operation, and associated actions under Alternative 1 would be the same as those described for the Proposed Action (see *Section 2.2.3, Description of Project Features and Operation*), except for the water pipeline and buried electric distribution power lines, which are described in the following text. Otherwise, the power plant and associated facilities, road access and transportation between I-15 and the power plant site, and the ground water wellfield would be the same as described for the Proposed Action.

2.3.3.1 Water Pipeline

The water pipeline would follow a more easterly alignment under Alternative 1 than under the Proposed Action. This eastern alignment would follow the existing road that extends south-southeast from the Tule Desert to the Toquop Wash plant site, with one exception. On its southern end, the pipeline would depart from the road and follow along the west side of a range line south for about 3 miles in order to avoid the FWS-designated desert tortoise critical habitat, which is on the east side of the rangeline in this area (see Map 2-2 and desert tortoise discussions in *Section 3.1, Threatened, Endangered, and Sensitive Species*). The ground water well pumps would pump directly to a raw water storage tank located on an intermediate high point several

miles southeast of the wellfield. The aboveground storage tank (configuration and color to be determined during final design to blend with background conditions) would then feed the water by gravity to the power plant. The storage tank would have a capacity of approximately 500,000 gallons and disturb no more than 1 acre of land. Electric distribution power lines from the power plant to the well pumps would be buried adjacent to the water pipeline.

The total length of this water pipeline would be 12.6 miles, or 0.1 mile longer than the more westerly route described for the Proposed Action. Its construction ROW (60 feet wide and 92 acres) and long-term right-of-way (30 feet wide and 46 acres) would be nearly identical in size to the western alignment under the Proposed Action. It would also have three 3-acre staging areas for construction: one near the north end; one near the mid-point of the pipeline; and one in the power plant site. Because the acreage for the third site is included in the total for the power plant site, water pipeline staging areas are considered to total 6 acres. All disturbed lands within these rights-of-way and staging areas would be reclaimed. Approximately 85 percent of the pipeline would run next to the existing road. This would provide easier, quicker access than the western alignment for larger vehicles should major maintenance or repair be necessary. In addition to being slightly longer, this alternative pipeline route would cross the main stem of the Toquop Wash at one of its deepest points (140 feet).

2.3.4 Construction Activities

Construction activities associated with site clearing and preparation, foundation construction, building and equipment installation, and site cleanup and facility start-up would be the same as those described for the Proposed Action (see *Section 2.2.4, Construction Activities*). Because of their nearly identical lengths, time and equipment requirements for constructing the eastern pipeline alignment under Alternative 1 would be the same as presented in Table 2-1 for the western pipeline alignment under the Proposed Action. Acres of lands disturbed and/or included in construction ROWs would be nearly identical to the Proposed Action, totaling approximately 451 acres (372 acres in Lincoln County and 79 acres in Clark County). Long-term disturbances would total 182 acres, the same as for the Proposed Action, with 269 acres being reclaimed.

2.3.5 Best Management Practices and Standard Operating Procedures

Activities that are a specifically directed and an integral part of Alternative 1 would be the same as those described for the Proposed Action (see *Section 2.2.5, Best Management Practices and Standard Operating Procedures*). They would consist of: complying with the terms and conditions of all ROWs issued by the BLM; the protection of desert tortoise habitat as described in *Appendix A*; following BMPs and SOPs listed in *Appendix B* that are associated with project construction, operation, and maintenance activities; and complying with stipulations of the *Cultural Resources Programmatic Agreement* contained in *Appendix C*.

2.3.6 Decommissioning

Decommissioning of the power plant site under Alternative 1 would be the same as

described for the Proposed Action (see *Section 2.2.6, Decommissioning*).

2.4 Alternative 2

2.4.1 Description of BLM Actions

BLM actions that could occur under the Alternative 2 include issuing ROWs necessary for project construction and operation, proceeding with this *Proposed Toquop Land Disposal Amendment to the Caliente MFP*, and completing the Toquop land disposal through sale or exchange.

However, specific actions could differ because of differences in the parcels of land to be disposed, location of the power plant site, and the nature and extent of the utility corridor and access road (see Map 2-3). In addition to the ROWs described for the Proposed Action, the BLM would issue ROWs for the construction and operation of an extended access road, a buried natural gas pipeline, and an overhead electric transmission line corridor that would be necessary for this northern power plant site. However, the water pipeline ROW would not be needed for this alternative. The BLM could amend the Caliente MFP in order to identify a parcel of public land in the Tule Desert in Lincoln County that is presently being managed by the BLM as being suitable for disposal through sale or exchange. The Tule Desert parcel would then serve as the power plant site under Alternative 2.

2.4.2 Description of Project Area, Land Disposal, and Power Plant Site

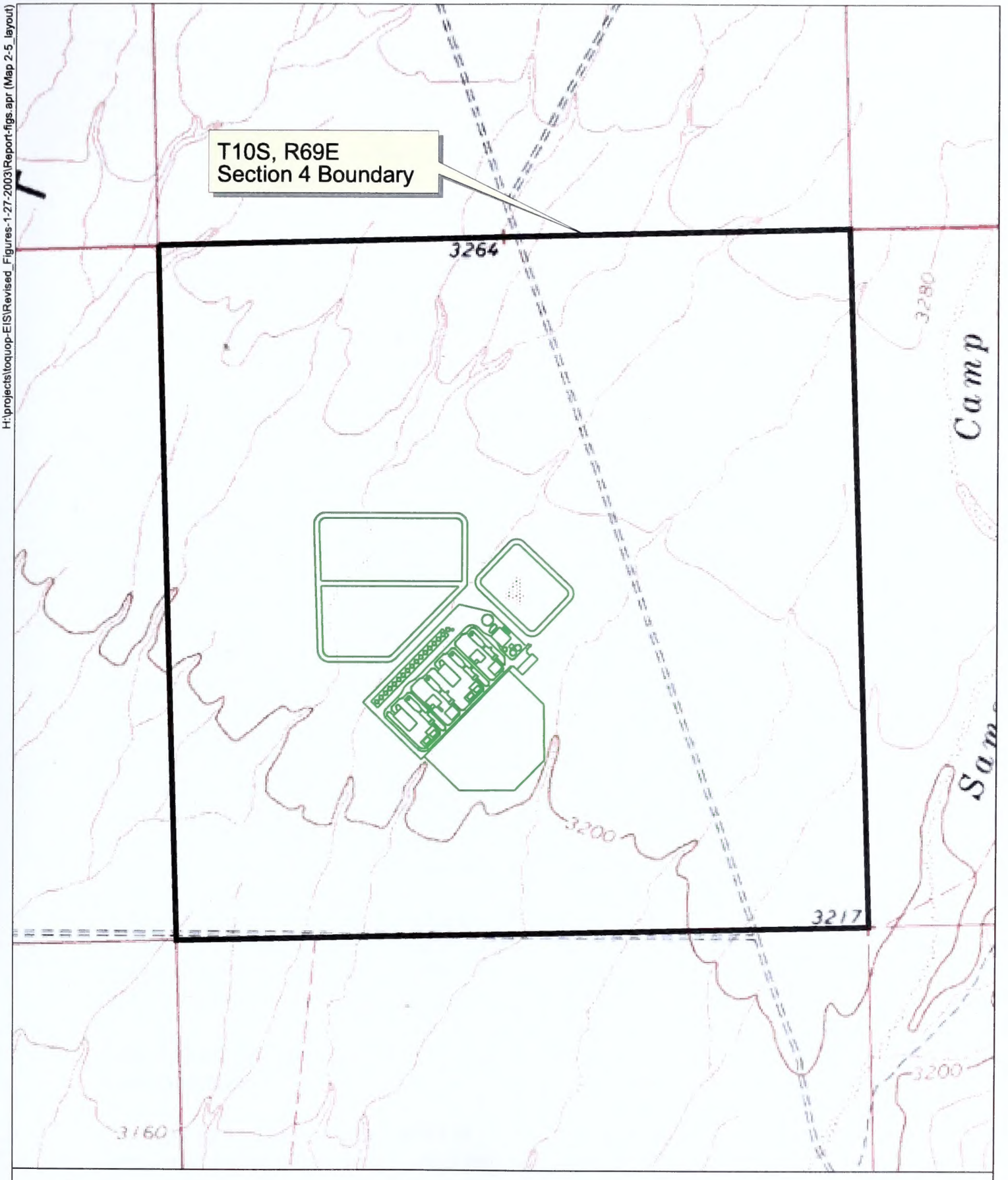
Map 2-3 depicts the project area, land disposal parcel, and power plant site. The overall project area for this alternative is the same as for the Proposed Action, although the locations of many of the project features would differ. Under Alternative 2, the power plant site shown on Map 2-5 would be located on the Tule Desert parcel in T10S, R69E, Section 4, approximately 12 miles north-northwest of the Toquop Wash site.

2.4.3 Description of Project Features and Operation

The features (see Map 3-2), operation, and associated actions for the power plant and wellfield would be the same for Alternative 2 as for the Proposed Action (see *Section 2.2.3, Description of Project Features and Operation*). Under Alternative 2, the power plant would be located adjacent to the wellfield in the Tule Desert. This would eliminate the need for constructing a long water pipeline, but would add the need for an electric transmission line and gas pipeline of 12.0 miles each. This location also is the site of one recently drilled potential production well. The well was drilled to gather data concerning the yields available from the ground water resources in this area, which would provide information necessary for the final design of the wellfield. Differences in the utility corridor and access road compared to the Proposed Action are described in the following text.

2.4.3.1 Utility Corridor

Locating the power plant in the Tule Desert under Alternative 2 would require the construction of 12.0 miles of buried natural gas pipeline to bring fuel to the site, and 12.0 miles of an overhead electric transmission interconnection to carry net power production to the Navajo-McCullough Electric Transmission Line and the Red Butte-Harry Allen Electric



Toquop Energy Project Proposed Plant Site Alternative 2 (Section 4)

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Map 2-5

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Transmission Line. It is anticipated that the gas pipeline would be 20 inches in diameter and the transmission interconnection would be 500-kV and 345-kV overhead lines, similar to the receiving transmission line. Both lines would be placed in a 120-foot-wide right-of-way adjacent to an existing road. Because of its width, construction staging areas would be located within the right-of-way. This 12.0-mile-long right-of-way would contain 175 acres. All disturbed lands in the corridor would be reclaimed except for that portion of the improved access road (discussed in *Section 2.4.3.2, Road Access and Transportation*) that would be located within the utility corridor.

Except at their southern ends, these two utility interconnection lines would follow the eastern water pipeline alignment described for Alternative 1 (see Maps 2-2 and 2-3 for alignment comparison). Neither the gas pipeline nor the electric line would cross the Toquop Wash, but would cross the range line into the FWS-designated desert tortoise critical habitat area. The utility lines would originate in T11S, R70E, Section 30, just east of the wash where the Kern River Gas Pipeline and the Navajo-McCullough Electric Transmission Line and Red Butte-Harry Allen Electric Transmission Line are in proximity. Starting the utility corridor at this point prevents 0.2 mile of habitat disturbance and completely avoids the difficult crossing of the Toquop Wash.

2.4.3.2 Road Access and Transportation

Constructing an additional 12.2 miles of access road would be required to reach the plant site under Alternative 2. This access road would continue from its proposed terminus described for the Toquop Wash power plant site under the Proposed Action, cross the Toquop Wash, proceed north through desert tortoise critical habitat (but outside an ACEC) for approximately 4.3 miles to the range line, then continue along the existing dirt road alignment to the Tule Desert plant site. This alignment would involve extensive grading, sub-base preparation, straightening, and paving of this primitive road, except where the road crosses the Toquop Wash. At this location, the road would only be smoothed and flattened slightly to facilitate the passage of larger construction equipment. In the event of intermittent flooding, access across the Toquop Wash would be delayed until flood waters subside or, alternatively, the power plant site would be accessed via the Carp-Elgin Road.

Of the 26.6-miles-long access road, the construction right-of-way for the 14.4 miles of upgraded access road from I-15 to the Toquop Wash site would disturb an additional 216 acres of habitat, plus require 20 acres for staging areas, the same as for the Proposed Action. After reclamation the net new disturbance for this 14.4-mile segment would be 65 acres (23 acres in Clark County and 42 acres in Lincoln County) (see Table 2-1). In addition, the southernmost 4.3 miles of the additional 12.2-mile road extension to the plant site would lie in a separate construction right-of-way (outside of ACECs) that includes approximately 53 acres. The net new disturbance following reclamation would be approximately 19 acres in the 4.3-mile segment. The remaining 7.9 miles of road would lie within the 120-foot-wide utility corridor right-of-way with the natural gas and electric lines. The net new disturbance from the 7.9-mile-long road segment would be approximately 36 acres. Any additional staging areas for the 12.2-mile road extension would be located within the

120-foot-wide utility corridor right-of-way and reclaimed following construction.

2.4.4 Construction Activities

The general types of construction activities associated with site clearing and preparation, foundation construction, building and equipment installation, and site cleanup and facility start-up would be the same as those described for the Proposed Action (see *Section 2.2.4, Construction Activities*). However, because of the proposed power plant location under Alternative 2, approximately twice the effort would be required to construct the access road compared to the Proposed Action (see Table 2-1). In addition, extending the natural gas pipeline and the electric transmission line under Alternative 2 would require substantially more effort than constructing the water pipeline under the Proposed Action.

An estimated 581 acres would be disturbed and/or included in construction rights-of-way for Alternative 2 (all but 79 acres would be in Lincoln County). This total would consist of 100 acres that would be fenced and enclose the power plant, switchyard, equalization and evaporation ponds, associated facilities, and a lay-down area; up to 15 acres for the wellfield; 1 acre for the monitoring well; 1 acre for the storage tank; 269 acres for the access road (216 acres in the initial 14.4 miles and 53 acres in the next 4.3 miles); 175 acres for the utility corridor; and 20 acres for staging areas. Disturbed lands within rights-of-way would be reclaimed, as described in the preceding text. Remaining long-term disturbances would total 237 acres and consist of 100 acres for the fenced power plant site; 17 acres for the wellfield, monitoring well, and storage tank; and 120 acres (23 acres in Clark County and 97 acres in Lincoln County) of net new disturbance for the access road. Other lands disturbed during construction along the access road, in the utility corridor, and at staging areas (344 acres) would be reclaimed.

2.4.5 Best Management Practices and Standard Operating Procedures

Activities under Alternative 2 would be the same as those described for the Proposed Action (see *Section 2.2.5, Mitigation and Enhancement*). They would consist of: complying with the terms and conditions of all ROWs issued by the BLM; protecting desert tortoise habitat as described in Appendix A; following BMPs and SOPs listed in Appendix B that are associated with project construction, operation, and maintenance activities; and complying with stipulations of the *Cultural Resources Programmatic Agreement* contained in Appendix C.

2.4.6 Decommissioning

Decommissioning of the power plant site under Alternative 2 would be the same as described for the Proposed Action (see *Section 2.2.6, Decommissioning*).

2.5 Alternative 3

2.5.1 Description of BLM Actions

BLM actions that could occur under the Proposed Action include issuing ROWs necessary for project construction and operation, proceeding with this *Proposed Toquop Land Disposal Amendment to the*

Caliente MFP, and completing the Toquop land disposal through sale or exchange.

2.5.2 Description of Project Area, Land Disposal, and Power Plant Site

Project features (see Map 2-1), their operation, and associated actions under Alternative 3 would be the same as those described for the Proposed Action (see *Section 2.2.3, Description of Project Features and Operation*), except that the power plant would be air-cooled. Map 2-6 shows the detailed location of the power plant site for Alternative 3.

2.5.3 Description of Project Features and Operation

2.5.3.1 General

Project features, their operation, and associated actions of Alternative 3 would be the same as the Proposed Action except for the following:

- Construct and operate an air-cooled combined cycle, natural gas-fired electric generating plant, with connections to a natural gas pipeline and electric transmission line. At the maximum anticipated summertime ambient temperature of 115°F, the air-cooled plant could produce up to approximately 947 MW. For comparison, the water-cooled plant could produce up to approximately 1,034 MW at the same ambient temperature.
- Drill up to an estimated three wells in the Tule Desert Basin (Hydrographic Basin #221) over the life of the project sufficient to produce an annual average flow of 100 gallons per minute (gpm) (200 gpm peak daily) of water for the power plant. It is estimated that the power plant could use up to approximately 170 acre-feet of water per year.
- Construct and operate a 12.5-mile-long, 4-inch-diameter buried water pipeline extending from the wellfield in the Tule Desert, through Toquop Gap, to the power plant near the Toquop Wash
- Construct and operate a small manifold collection system to interconnect the water output from the wellfield to a pressure-regulating water tank
- Construct and operate a small pressure-regulating water tank located near the wellfield before the water pipeline to the power plant

2.5.3.2 Power Plant Facilities

This section briefly describes the differences in power plant facilities between Alternative 3 (air-cooled plant) and the Proposed Action (water-cooled plant), which was described in *Section 2.2.3.2, Power Plant Facilities*. Figure 2-3 presents a conceptual rendering of the Alternative 3 air-cooled plant.

The production process for the air-cooled plant is the same as for the water-cooled plant until after the steam passes through the steam turbines. After steam passes through the steam turbine, it would be condensed to liquid in the condenser and pumped back to the heat recovery steam generator to repeat the cycle, the same as for the Proposed Action. However, for Alternative 3, the condenser would be a large finned-tube heat exchanger that operates at vacuum within the tubes. Large fans would be used to push air across the

tubes, transferring the heat from the condensing steam to the ambient air. Depending on vendor designs, the condensers would consist of either two or four units with a total of approximately 12 bays with five fans per bay. Each of these 60 fans would be approximately 30 feet in diameter and equipped with a 200-horsepower electric motor. Overall power consumption of the total condensing system would be approximately 9,200 kilowatts (kW). The condensing system would cover at least 2.2 acres and be approximately 87 feet tall. Figure 2-2 shows a schematic of this combined cycle electric power production process.

Blowdown from the steam cycle and wastewater created by production of ultra-pure steam cycle makeup water would go to a brine concentrator and then be further managed onsite using a geomembrane double-lined equalization pond and double-lined 3- to 5-acre evaporation pond. Each liner would be 60 mils thick. An onsite equalization pond (up to 1 acre) would be used to balance seasonal fluctuations in wastewater flowrate, thus reducing treatment equipment sizing. No wastewater would be discharged from the ponds to any surface water or offsite treatment facilities. Solids filtered or settled from the wastewater in the recycle process would be removed from the site as required, and disposed of at an approved offsite disposal facility.

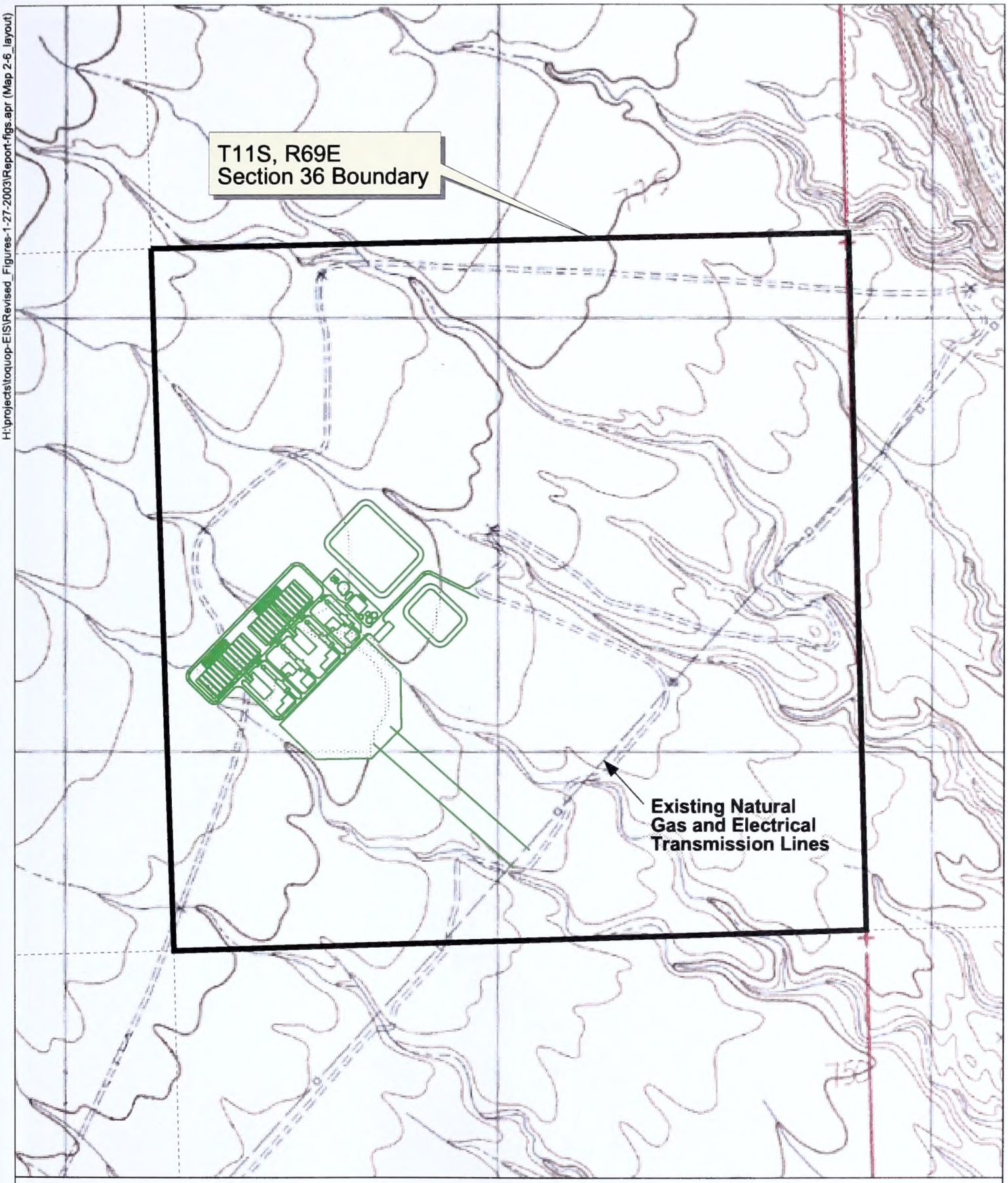
2.5.3.3 Road Access and Transportation

The road access and transportation features would be the same as for the Proposed Action (see *Section 2.2.3.3, Road Access and Transportation*).

2.5.3.4 Wellfield

Ground water is proposed for use in power plant operations, including steam-cycle makeup and chilling of combustion air. Approximately 100 gallons per minute (gpm) of water (approximately 0.44 acre-feet of water per day) would be required under annual average design operating conditions. Because of seasonal fluctuations in plant operations and use of the inlet air chilling system, peak day water demand would be up to approximately 200 gpm (approximately 0.88 acre-feet of water per day). A demineralized water treatment system would be utilized to produce the ultra-pure water required by those systems.

Alternative 3 includes the development of a wellfield in the Tule Desert Hydrographic Basin (#221) to supply ground water to the power plant. Descriptions of the well field in the southern third of the Tule Desert (see Map 2-1), production well locations and the downgradient monitoring well, area of disturbance associated with each well, and system of collection pipelines, well access roads, and electrical service lines are similar to those for the Proposed Action (see *Section 2.2.3.4, Wellfield*), with the following exceptions. Under Alternative 3, it is assumed that up to three deep wells (rather than up to 15 deep wells for the Proposed Action) would be required over the life of the project and would disturb no more than 3 acres total. In addition, a manifold system would interconnect the output from each of these wells to a 4-inch-diameter buried pipeline (rather than a 24-inch-diameter buried pipeline for the Proposed Action) that would extend from the Tule Desert approximately 12 miles to the Toquop Wash plant site. The raw water storage tank used to maintain constant flow in the pipeline



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Toquop Energy Project Proposed Plant Site
Alternative 3 (Dry Cooling)
(Section 36)

Map 2-6

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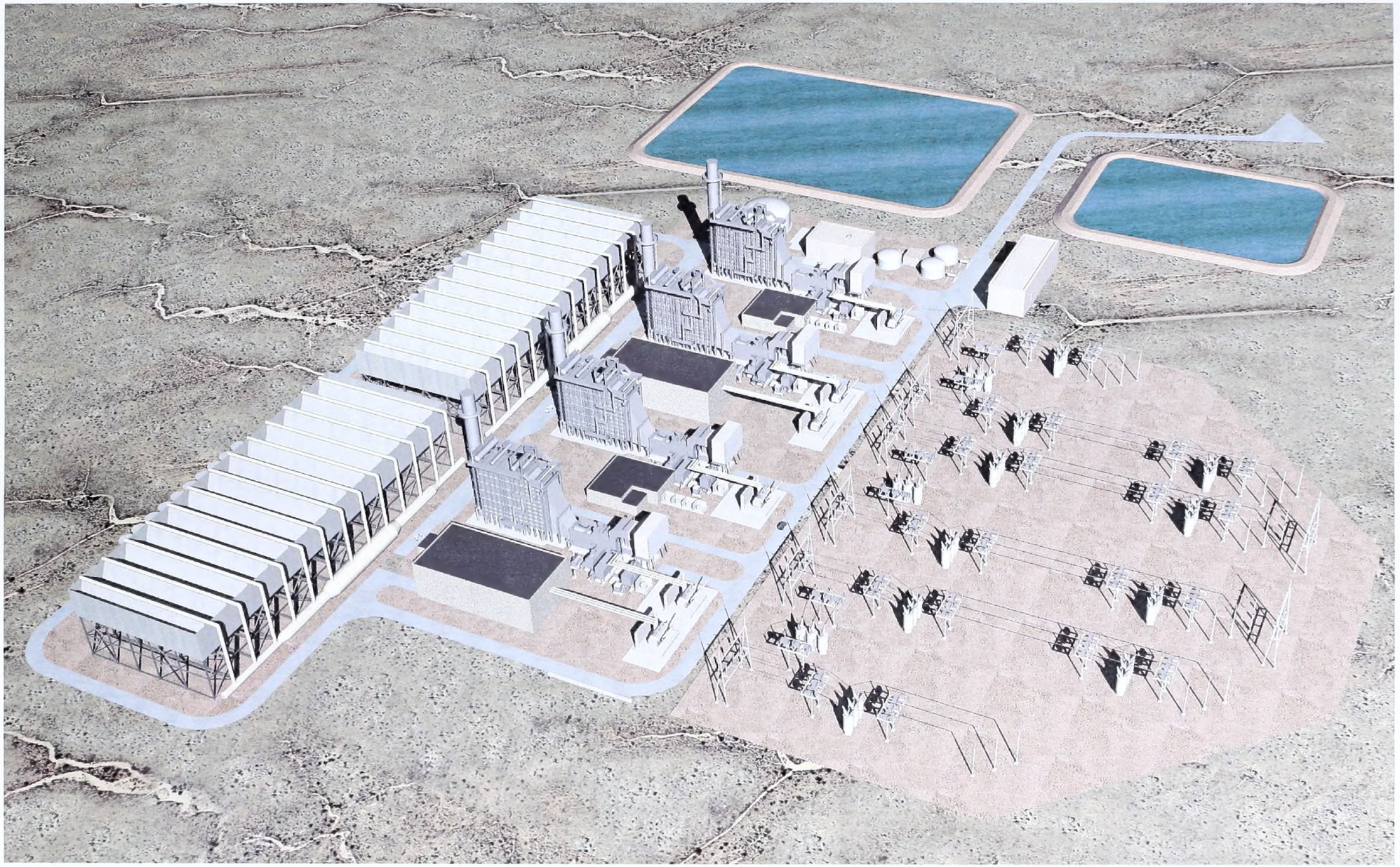


Toquop Energy Project
Air-Cooled Power Plant
Conceptual Rendering

Figure 2-3

would be similar to, but smaller in size, than the 500,000-gallon storage tank described for the Proposed Action, and would disturb no more than 1 acre. Access to this storage tank and the production wells would be the same as for the Proposed Action.

Permanent water rights that would be required to supply up to 170 acre-feet of water per year from the Tule Desert wellfield necessary to operate the Toquop Energy Project under Alternative 3 have been jointly applied for by Vidler Water Company, Inc. (a sister company of NLRC) and Lincoln County. The Nevada State Engineer has approved 2,100 acre-feet of water per year of the Vidler Water Company - Lincoln County water right applications. Toquop Energy would acquire these water rights for the 42-year life of the project at which time water rights would revert to Lincoln County.

2.5.3.5 Water Pipeline

Ground water withdrawn from the Tule Desert wellfield would be pumped and gravity-fed through a 4-inch-diameter ductile iron or steel pipeline 12.5 miles to the power plant site. Pipeline capacity would only be sufficient for the Toquop Energy Project air-cooled power plant. Other features of the water pipeline would be the same as for the Proposed Action including acres of land disturbed and reclaimed (see *Section 2.2.3.5, Water Pipeline*).

2.5.4 Construction Activities

Construction activities associated with site clearing and preparation, foundation construction, building and equipment installation, and site cleanup and facility start-up would be similar to those described for the Proposed Action (see *Section 2.2.4, Construction Activities*) with the exception of differences in the acres of land disturbed and reclaimed as described below.

An estimated 417 acres would be disturbed and/or included in construction rights-of-way under Alternative 3. This total would consist of 80 acres that would be fenced and enclose the power plant, switchyard, condensers, equalization and evaporation ponds, associated facilities, and a lay-down area; 216 acres of new disturbance for the access road; up to 3 acres for the wellfield; 1 acre for the monitoring well; 1 acre for the storage tank; 90 acres for the water pipeline; and 26 acres for staging areas (20 acres for the access road and 6 acres for the water pipeline). Disturbed lands within rights-of-way would be reclaimed as a component of Alternative 3 according to measures described in *Section 2.2.5, Best Management Practices and Standard Operating Procedures*. Long-term disturbances would total 150 acres and consist of approximately 80 acres for the fenced power plant site; 5 acres for the wellfield, monitoring well, and storage tank; and 65 acres of net new disturbance for the access road. Other lands disturbed during construction along the access road, in the pipeline right-of-way, and at staging areas (267 acres) would be reclaimed.

2.5.5 Best Management Practices and Standard Operating Procedures

Activities that are a specifically directed and an integral part of Alternative 3 would be the same as those described for the Proposed Action (see *Section 2.2.5, Best Management Practices and Standard Operating Procedures*). They would consist of: complying with the terms and conditions of all ROWs issued by the

BLM; the protection of desert tortoise habitat as described in *Appendix A*; following BMPs and SOPs listed in *Appendix B* that are associated with project construction, operation, and maintenance activities; and complying with stipulations of the *Cultural Resources Programmatic Agreement* contained in *Appendix C*.

2.5.6 Decommissioning

Decommissioning of the power plant site under Alternative 3 would be the same as described for the Proposed Action (see *Section 2.2.6, Decommissioning*).

2.6 No Action Alternative

Section 1502.14(d) of NEPA regulations requires that the alternatives analysis in an EIS include a No Action Alternative. Under the No Action Alternative for this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* project-related ROWs would not be created, the Caliente MFP would not be amended, none of the project-related land disposals through sale or exchange would occur, and the power plant and related facilities would not be built or operated as described for the Proposed Action, Alternative 1, Alternative 2, or Alternative 3.

If the No Action Alternative is selected for implementation, existing conditions and trends that are described for the affected environment in *Chapter 3, Affected Environment*, of this document would continue. As a result, none of the project purposes and needs that were described in *Section 1.2, Purpose and Need*, would be met.

2.7 Alternatives Considered During Scoping but Eliminated from Further Consideration

This section describes alternatives, their components, or possible ancillary improvements that were considered in developing the Proposed Action, but which were rejected from further consideration, and the reasons for their rejection.

2.7.1 Alternative Generating Technologies

Alternative fuels to natural gas were considered but eliminated from further consideration because they would not meet an important component of project purpose and need—the need to generate electrical power at competitive costs for use by consumers to ease forecasted power shortages in the western United States. Some generating technologies were eliminated from further consideration because of fuel or resource limitations. Specifically, hydroelectric was eliminated from consideration because of a lack of available surface water resources in the general project area. Furthermore, the development of a 1,100-MW hydroelectric power plant would require the construction of a large impoundment and dam that would likely result in significant environmental impacts.

The use of biomass as a fuel was eliminated from further consideration because of economic, transportation, and fuel source availability constraints. Currently, no reasonably available sources of biomass to fuel a 1,100-MW power plant exist in the general vicinity of the proposed project site.

Fuel oil was evaluated as a possible fuel for the proposed project, but was eliminated from further consideration because no fuel oil is available in the general vicinity of the project site. In addition the cost of generation for an oil-fired power plant using combined cycle technology is typically higher than the same facility burning natural gas. The cost difference results from a combination of the cost differential between the fuel oil and the natural gas as well as the cost of fuel handling and additional air emissions controls required for the fuel oil. Further, there are risks from potential spills of fuel oil during its transport and storage .

Table 2-3 presents a comparison of the air emissions, land requirements, anticipated capacity factor, and costs of generation for natural gas (using both wet and dry cooling), coal, wind, and solar.

The power plant sites for the Proposed Action, Alternatives 1 and 3, and to a lesser extent for Alternative 2, are well-suited for the delivery of natural gas via the Kern River Gas Pipeline. Using natural gas also presents some air quality and visibility benefits compared to coal and fuel oil. The use of coal as a fuel would require the construction of up to 41 miles of new rail line at a cost of $750 million or more, additional fuel, and waste handling systems including coal pile and ash handling and storage facilities. The onsite handling and storage of coal would result in fugitive dust emissions and increased noise levels. Because the use of coal would change the basic technology of the power plant design, all of the electricity would be generated through the steam cycle, thus requiring approximately three times as much water (approximately 20,000 acre-feet per year) for cooling than needed for the gas fired technology.

Various solar power technologies that use a system of photovoltaic cells or that concentrate solar energy power through the use of parabolic troughs, collector dishes, or tracking mirrors were considered. None of these solar power alternatives were found to be practical or feasible to cost-effectively and efficiently meet the project purposes and needs. Their limitations include extremely large land requirements, higher cost of generating power, lower anticipated capacity factor.

Wind generation was considered and eliminated from further consideration because of the higher cost of generation and the lower anticipated capacity factor.

2.7.2 Alternative Locations

Alternative project locations were considered but eliminated from further consideration because they would not meet the project purposes and needs described in Chapter 1 of this document. The project sites shown in Map 1-1 were selected because they present the greatest benefits to Toquop Energy and consumers through the cost-effective generation and sale of electric power to help meet local and regional demand, and to Lincoln County through increased economic benefits associated with project development. The Proposed Action location is the only potential power plant site in Lincoln County located outside of desert tortoise critical habitat, with existing access, and that is crossed by existing electric lines and a natural gas pipeline. Alternative project locations presented greater environmental impacts (proximity to Class I areas and ACECs); greater impairment of visual, biological, and ground water resources; difficulty and additional costs for fuel delivery and transmission line access; and lack of economic benefits to

TABLE 2-3
Comparison of Alternative Fuels

		Method of Generation				
		Natural Gas-Fired Generation		Alternative Generation Methods		
Issue	Units	Water-Cooled Combined Cycle at Toquop	Air-Cooled Combined Cycle at Toquop	Wind Power	Photovoltaic	Coal Plant at Toquop[5]
Air Pollutant Emissions						
NOx	Pounds per net MW-hr, annual average[1]	0.062	0.063	NA	NA	0.67
CO	Pounds per net MW-hr, annual average	0.141	0.144	NA	NA	1.43
SO2	Pounds per net MW-hr, annual average	.037	.038	NA	NA	0.95
Greenhouse Gas Emissions						
$CO_2 + CH_4 + N_2O$	Tons CO_2 equivalent per net MW-hr, annual average	0.36	0.37	NA	NA	0.98
Fuel Consumption	BTUs per net kW-hr	6,224	6,351	NA	NA	9,500[5]
Land Required	Acres per 1,000 MW	42	22	500	10,000	900
Anticipated Capacity Factor	Actual generation per theoretical max, %	96.4	96.4	20 to 35	20 to 30	75
Anticipated Capital Cost	Cost per installed kW	$709	$717	$12,002	$5,000 - 10,000	$1,246
Total Cost of Generation	Cost per kW-hr	$0.0327[4]	$0.0333[4]	$0.047 to 0.057[2]	$0.10 - $0.15[3]	$0.0480[4]

[1]Assuming use of SCR for target NOx effluent of 2.5 ppmvd @ 15% O_2.
[2]Cost of generation does not include $0.017/kW-hr tax credit for wind power.
[3]Cost of generation does not include $0.017/kW-hr tax credit for solar power.
[4]Does not include depreciation of capital equipment.
[5]Based on aggressive control targets for coal pollutant controls, and assumption of state-of-art boiler design.

communities within and near Lincoln County.

2.7.3 Alternative Access Road

An existing access road is available from I-15 to the proposed power plant site. Nearly all of the Lincoln County and all of the Clark County portions of the existing road are within the Mormon Mesa ACEC. Alternatives to upgrading that road would require a new road through the Mormon Mesa ACEC and designated critical desert tortoise habitat or upgrading a

considerably longer existing road that would impact desert bighorn sheep habitat. Both the Caliente MFP, which covers the Lincoln County portion of the existing access road, and the Las Vegas RMP, which covers the Clark County portion of the existing access road, allow the upgrade of an existing road within an ACEC, provided all resource constraints in the MFP and RMP are enforced. In addition, both the Caliente MFP and Las Vegas RMP state that the Mormon Mesa ACEC is a right-of-way avoidance area. New roads in ACECs can only be authorized in response to specific proposed actions where no feasible alternative exists. It would not be possible to construct a new access road with the same relatively direct access to I-15 and the City of Mesquite as the existing access road without impacting undisturbed lands in both the Lincoln County and Clark County portions of the Mormon Mesa ACEC. This is not allowed under the MFP or RMP where a feasible alternative exists (in this instance the existing access road). Further, any newly constructed access road that avoids the Mormon Mesa ACEC and provides access from the City of Mesquite and I-15 to the power plant sites would be substantially longer than the improved, existing access road.

These significant policy and environmental constraints make alternative access roads infeasible and were, therefore, rejected from further analysis. In addition, the construction methods, use of staging areas, proposed road width, and nature of road improvements as described in *Section 2.2.3.3, Road Access and Transportation*, are necessary in order to construct the types of facilities associated with the proposed project and to then operate the proposed project continuously over a 42-year period. Without the upgrade, the road would deteriorate to the point at which it would no longer meet the required level of service.

2.8 Preferred Alternative

BLM's Preferred Alternative is the Proposed Action which includes:

- Issue ROW for southern power plant site (Section 36)
- Issue ROW for western utility alignment
- Issue ROW for wellfield
- Issue ROW for Access Road between I-15 and southern power plant site
- *Proposed Toquop Land Disposal Amendment to the Caliente MFP*— Section 36 (southern parcel) suitable for disposal
- Toquop/Pah Rah (Washoe County) land exchange (Section 36)
- Construction and operation of a up to 1,100-MW natural gas-fired water-cooled power plant and ancillary facilities
- Comply with other requirements:
  - *Measures for Protecting Desert Tortoises and their Habitat (Appendix A)*
  - *Standard Construction and Operation Procedures (Appendix B)*
  - *Cultural Resources Programmatic Agreement (Appendix C)*

Chapter 3
Affected Environment

Chapter 3.0 Affected Environment

3.1 Introduction

This chapter describes the affected environment associated with the Proposed Action and alternatives for the Toquop Land Disposal amendment to the Caliente MFP and the Toquop Energy Project. The affected environment discussions describe existing conditions for those resources comprising the physical, biological, cultural, and human and socioeconomic environments within the project area. Maps 2-1, 2-2, and 2-3 in Chapter 2 depict the project area for the Proposed Action and Alternative 3, Alternative 1, and Alternative 2, respectively. These project areas include the Toquop and Pah Rah land parcels and adjacent lands in the Toquop area for which the BLM would process a land exchange and/or issue ROWs for the construction, operation, and maintenance of the proposed project. The Toquop and Pah Rah areas, as well as the project areas and project features for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3 are described in detail in *Chapter 2, Sections 2.1 through 2.5.*

3.2 Soils and Geology

3.2.1 Soils

This section describes the soils of the three land parcels being evaluated, the alternative water pipeline alignments, the natural gas pipeline and transmission line alignment, the wellfield, and the access roads to the two alternative power plant sites. The U.S. Natural Resources Conservation Service (NRCS) (1965, 1979, 1990) provides more detailed information on soils.

3.2.1.1 Toquop Area

3.2.1.1.1 Proposed Action. The Proposed Action power plant site and water pipeline corridor (southern Toquop parcel, western water pipeline alignment) cover four soil associations: the Aymate-Canutio, Mormon Mesa, St. Thomas-Zeheme-Rock Outcrop, and the Zeheme Rock Outcrop associations (NRCS, 1990). The proportion of the four associations varies according to project area location. The Aymate-Canutio association consists of well-drained soils ranging from very gravelly loamy sand to gravelly sandy loam with a slight slope of 2 to 4 percent. The soils are highly susceptible to wind erosion and moderately susceptible to water erosion, factors that may have a bearing on reclamation potential. The Mormon Mesa association consists of well-drained soils ranging from fine sandy loam to gravelly fine sandy loam, primarily with a very slight slope of zero to 2 percent. The soils are highly susceptible to wind erosion and slightly susceptible to water erosion. The St. Thomas-Zeheme-Rock outcrop association consists of predominantly well-drained soils ranging from very gravelly sandy loam to very gravelly fine sandy loam, and some unweathered bedrock. Slopes are steep, varying from 20 to 50 percent. The loams are generally moderately susceptible to both wind and water erosion. The Zeheme-Rock outcrop association consists of extremely stony fine sandy loam (well-drained) and unweathered bedrock with steep slopes from 30 to 50 percent. The loam is slightly susceptible to both wind erosion and water erosion.

The access road would cross four soil map units. These are: the Mormon Mesa fine sandy loam with zero to 8 percent slopes; the Flattop gravelly clay loam with 2 to 8 percent slopes; the Rock Land-St. Thomas cobbly loam association with slopes from 15 to 60 percent; and the Badland unit of stratified sand, silt, and clay with slopes from 15 to 50 percent. These units are generally well-drained, except for the Badland where runoff is very rapid, and the wind and water erosion potential varies from slight to very high.

A mosaic of 25 soil associations are distributed across the proposed wellfield in the Tule Desert. The soils are predominantly gravelly sandy loam to very gravelly sandy loam in texture, with some cobble-dominated soils and very fine to fine sandy loam soils. Slope varies from zero to 75 percent with many of the associations falling within the zero to 15 percent or 30 to 50 percent ranges. All associations are well-drained, with the exception of associations having the Arizo soil series which is excessively drained. The majority of the associations are only slightly wind erodible, with a few being very slightly erodible to not erodible by wind. The Geta soil series in the Geta-Arizo association is extremely wind erodible. The majority of the soil associations in the proposed wellfield area are not highly susceptible to water erosion.

Biological soil crusts are present at the proposed power plant site and along the proposed water pipeline corridor. No biological soil crusts appear to be located in the wellfield. These soil crusts serve to reduce the rate of water and wind erosion that could occur in their absence.

3.2.1.1.2 Alternative 1. The power plant site and water pipeline corridor for Alternative 1 (southern Toquop parcel, eastern water pipeline alignment) occur on four soil associations. Three of these are the same as described for the Proposed Action: the Aymate-Canutio, Mormon Mesa, and St. Thomas-Zeheme-Rock outcrop associations. The fourth association, the Bracken gravelly fine sandy loam with 2 to 8 percent slopes, is considered to be somewhat excessively drained. This association is highly susceptible to wind erosion and moderately susceptible to water erosion.

The access road would cross the same soil map units described for the Proposed Action. Biological soil crusts are present along the proposed water pipeline corridor and the proposed power plant site.

3.2.1.1.3 Alternative 2. The power plant site and utility corridor for Alternative 2 (northern Toquop parcel, eastern gas pipeline/transmission line alignment) occur on the same four soil associations as Alternative 1. These are the Aymate-Canutio, Mormon Mesa, and St. Thomas-Zeheme-Rock outcrop associations, and the Bracken gravelly fine sandy loam with 2 to 8 percent slopes (NRCS, 1990).

The access road would cross the same soil map units described for the Proposed Action south of the southern Toquop parcel and the same soil map units described for the pipeline/transmission line utility corridor north of the southern Toquop parcel. Biological soil crusts are present along the utility corridor and may also occur at the northern power plant site.

3.2.1.1.4 Alternative 3. The sites for the power plant, water pipeline corridor, access road, and wellfield for Alternative 3 air-cooled power plant, southern Toquop parcel, western water pipeline alignment) are the same as were described for the Proposed Action. The descriptions of soils

for Alternative 3 are the same as those presented in *Section 3.2.1.1.1, Proposed Action.*

3.2.1.2 Pah Rah Parcel

The Pah Rah exchange parcel consists of the Oppio-Rezave-Rock outcrop association, the Osobb-Rezave-Fireball association, and the Bombadil-Hefed-Rubble land association (NRCS, 1979). The Oppio-Rezave-Rock outcrop association is the primary soil association on the Pah Rah parcel. It consists of extremely stony very fine sandy loam and rock outcrop. It is well-drained and occurs on slopes up to 15 percent. The hazard of wind erosion is slight. The Osobb-Rezave-Fireball association is found on the southern portion of the Pah Rah parcel. It consists of extremely stony fine to very fine sandy loam, with slopes up to 50 percent. The hazard of water erosion is slight to high, and the hazard of wind erosion is slight. The Bombadil-Hefed-Rubble land association is found on the northern portion of the Pah Rah parcel. It consists primarily of very stony sandy loam with slopes between 10 and 70 percent. The hazard of water erosion is high, and the hazard of wind erosion is slight.

3.2.2 Geology

3.2.2.1 Toquop Area

This section provides context for the subsequent evaluation of potential project-induced environmental consequences to the local geologic resources in the project area. Geologic features and issues related to seismicity are also discussed in this section. Additional geologic-related information is presented in *Section 3.4, Ground Water Resources*, as context for evaluating the potential impacts to ground water resources.

3.2.2.1.1 Regional Geologic History and Setting. The project area is located within the Basin and Range physiographic province, which covers much of interior western North America (see Map 3-1). The Basin and Range Province owes its descriptive name to the general geologic history common to this part of the country that has given rise to the present-day landscape of alternating generally north-south trending mountains separated by intervening valleys or basins.

Although the current landscape formed only during the past 10 to 20 million years, the geologic history of the region is much longer with important features dating to the Precambrian Era (more than 550 million years before present [Ma]). Igneous and metamorphic rocks of Precambrian age are the oldest and lowest unit in the regional stratigraphic column and are therefore commonly referred to as "basement." Early Cambrian age formations principally consisting of quartzite and shale are also typically considered basement primarily because of their relatively impermeable nature with respect to ground water flow (see *Section 3.4, Ground Water Resources*).

Throughout much of the Paleozoic Era, beginning in the early Cambrian time (around 500 Ma) and continuing into the Permian Period (approximately 250 Ma), present-day eastern and southern Nevada formed the continental shelf off of what was then the west coast of North America (the ancient shoreline ran through present-day western Utah). This shallow marine environment gave rise to the deposition of massive sequences of carbonate rocks (such as limestone and dolomites) that accumulated to thicknesses of as much as

30,000 feet. The area that formed the ancient continental shelf stretched from present-day southern Idaho, across eastern Nevada to southeastern California. The resulting carbonate deposits are exposed in many mountain ranges, and form a thick wedge, generally thinning eastward, that constitutes an extensive regional feature commonly referred to as the carbonate-rock province. The thickness and lithology (composition) of the Paleozoic carbonate rocks are notable in their homogeneity over large areas in the province. The carbonate-rock province is discussed further in *Section 3.4, Ground Water Resources*, with respect to ground water resources.

The Permian Period (between 240 and 290 Ma) generally marked the end of the environment that produced the thick deposits of carbonate rock, and by the middle Triassic (approximately 220 Ma) the continental margin had shifted westward so that present-day eastern Nevada was an area of continental deposition. Rocks of middle Triassic to Early Jurassic age in eastern Nevada, therefore, largely consist of sandstone, shale, and freshwater limestone.

It was also during the late Mesozoic that the Sevier orogeny (period of mountain building) occurred that coincided with extensive regional compression of the earth's crust generally along the same belt that formed the ancient continental shelf during Paleozoic time (from southern Idaho through western Utah and southeastern Nevada and California). This period of crustal compression resulted in extensive folding and thrust faulting in which older (Paleozoic) rocks were pushed up and over younger (Mesozoic) rocks. In some cases, folding and thrust faulting resulted in doubling or tripling the total thickness of the Paleozoic carbonate rocks.

The geologic structure of the region became even more complex in the middle late Tertiary (starting around 20 Ma) when the tectonic forces reversed, resulting in crustal extension (stretching). The entire region underlying present-day eastern Nevada was essentially pulled apart by tensional forces. Large-scale normal (vertical offset) faulting caused huge blocks to be dropped, tilted, or rotated in response to being pulled apart or thinned. In addition to extensive normal faulting, nearly vertical strike-slip (lateral offset) faulting and widespread volcanism also occurred during middle and late Tertiary times. The overall result of the east-west extensional tectonics was that north-south oriented mountain ranges were raised and tilted, and basins formed in the intervening depressed areas. Erosion of the mountain ranges and the subsequent deposition of the erosional debris filled the valleys with several hundred to several thousand feet of sediment. The resulting parallel sequence of mountain ranges and intervening basins combine to give the region its characteristic basin-range topography seen today.

3.2.2.1.2 Local Geology. Expressions of the aforementioned geologic history are exposed locally within and around the project area (see Map 3-2). The plant site under the Proposed Action is located on the northern flank of the lower Virgin River Valley, between the East Mormon Mountains to the west and the Tule Springs Hills to the north and northeast. Structurally, the lower Virgin River Valley consists of a deep tectonic basin referred to as the Virgin River Depression. With a depth of up to 6 miles, the Virgin River Depression is one of the deepest basins in the Basin and Range Province (Langenheim et al., 2001).

H:\projects\toquop-water_toquop-water.apr (Basin and Range Province Layout)

N

0 100 200 300 Miles

Source:
Fenneman's 1:7,000,000 Physical Divisions of the United States - USGS

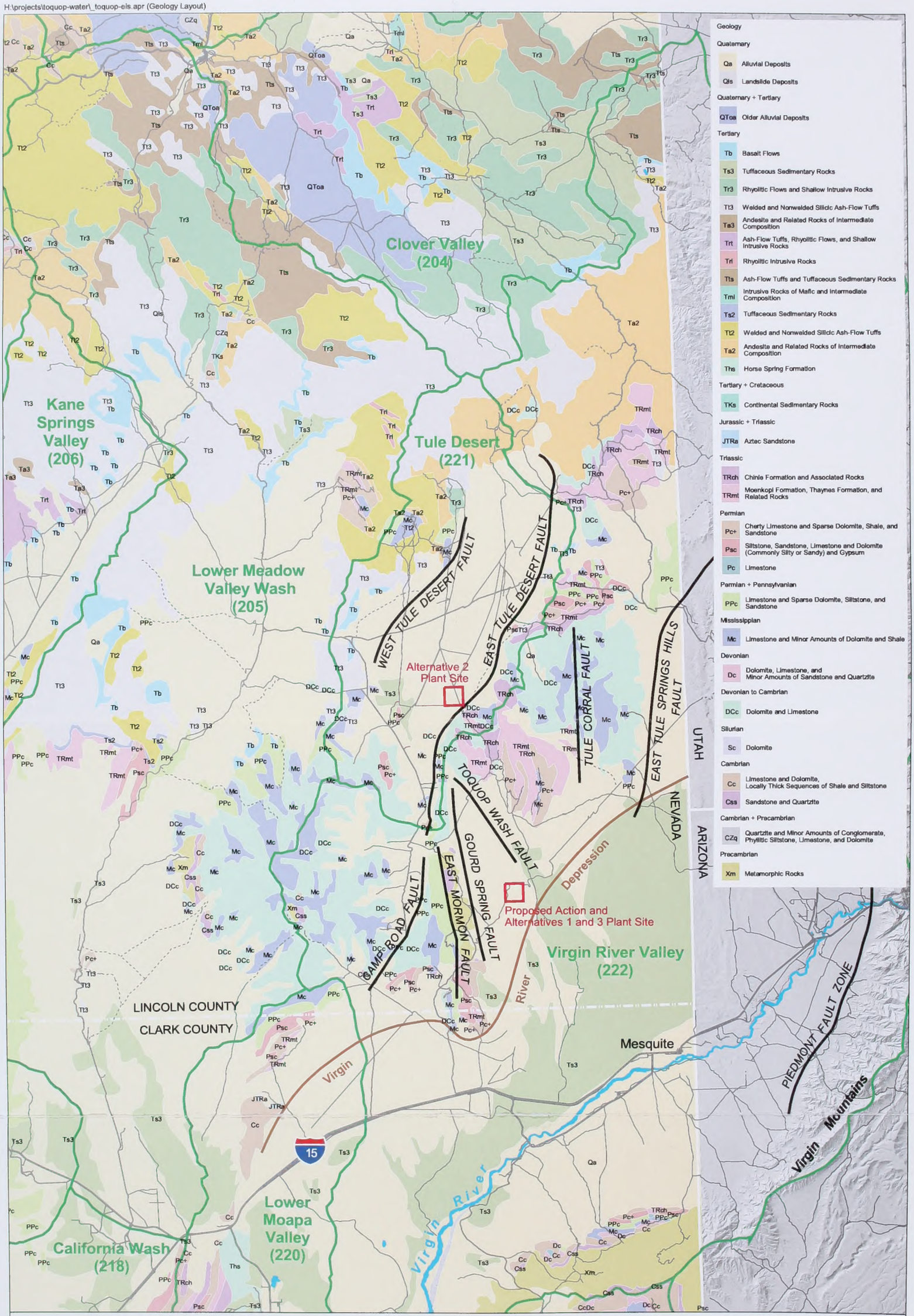
Location and General Extent of the Basin and Range Province

Map 3-1

CH2MHILL

W012002002BOI

H:\projects\toquop-water_toquop-els.apr (Geology Layout)



N

0 5 10 Miles

Legend

- Hydrographic Boundary
- Geologic Fault
- Virgin River Depression (1)
- Road
- Trail
- Waterbody

Sources: 1:100,000 Vector Linework - BLM Nevada
1:500,000 Geologic Map of Nevada - USGS Reno
1:253,440 Geologic Map of Lime Mtn Quad - NBMG

1. The line depicted on the map is intended to approximate the boundary of the Virgin River Depression for illustrative purposes and is not intended to be an exact demarcation.

General Geology in the Vicinity of the Project Area

Map 3-2

CH2MHILL

The substrate at the plant site consists of alluvial material composed of the erosional debris from the surrounding uplifted areas. Much of the basin-fill deposits in the lower Virgin River Valley north of the Virgin River, including in the vicinity of the proposed plant site, consist of the Muddy Creek Formation. Outcrops of this formation just west of Mesquite have been described by Kowallis and Everett (1986) to be poorly sorted coarse to fine-grained sand and sandstone with siltstone and mudstone. At the plant site, under the Proposed Action, ephemeral washes have cut into the alluvium exposing firmly cemented gravel conglomerate, at least 5 feet thick, within a few feet below the surface. The lateral extent of this calcium-carbonate cemented material is unknown, but is likely to be widespread in the vicinity of the plant site. This conglomerate layer is very hard and will likely require blasting to remove if excavation is required during construction. The need for blasting will depend on results of geotechnical investigations during final design.

Under the Proposed Action and Alternative 3, the utility corridor passes through the Toquop Gap, which separates the East Mormon Mountains on the south from the Tule Springs Hills to the north. For Alternatives 1 and 2, the utility corridor passes directly through the Tule Springs Hills, which are prime examples of the extreme structural complexity that characterizes basin and range geology. The utility corridor for these alternatives follows the existing dirt road that snakes though a small topographic gap produced by massive local thrust faulting just south of Jumbled Mountain whose descriptive name portrays the complex local geology of the Tule Springs Hills.

The wellfield and the plant site under Alternative 2 lie within the Tule Desert, which is described in more detail in *Section 3.4, Ground Water Resources*. The near-surface substrate (up to approximately 1,000 feet deep) in the Tule Desert consists of unconsolidated to semi-consolidated alluvial basin-fill deposits, which were deposited as erosional debris from the surrounding uplifted areas. Based on test drilling within the wellfield area, the Tule Desert basin-fill deposits consist of principally unconsolidated coarse sands and gravel with some silt and clay within the uppermost 100 to 200 feet, but thereafter rapidly progress into a thick (greater than 500 feet) sequence of silts, clays, and sands. At depths of at least 600 feet, the proportion of coarse-grained sediments (silty sands and gravel) increases. Unlike at the plant site for the Proposed Action, no conglomerate or caliche (calcium carbonate) layers have been observed. Based on the local test drilling, the depth to consolidated rock is on the order of 1,000 feet.

3.2.2.1.3 Geologic Faults and Seismicity. The complex geologic history of the project area and its vicinity has resulted in numerous geologic faults along which both significant vertical and lateral offset has occurred in the distant past. Despite the extensive local faulting, however, few significant active faults occur in the vicinity of the project area.

The nearest, most significant, active faults are associated with the Piedmont fault zone. This fault zone, which cuts Pleistocene terrace deposits, runs along the northern base of the Virgin Mountains and extends along the western base of the Beaver Dam Mountains, approximately 20 miles south and east of the plant site for the Proposed Action.

Other mapped and named but inactive faults in the project area include the following:

- The Gourd Spring fault, which runs along the eastern base of the East Mormon Mountains
- The East Tule Desert fault, which parallels the Gourd Spring Fault along the west side of both the East Mormon Mountains and the Tule Springs Hills
- The Tule Corral fault, which runs north-south through the southern Tule Springs Hills
- The East Tule Springs Hills fault, which cuts through the southern Tule Springs Hills and parallels the Tule Corral Fault approximately 10 miles to the east

In the vicinity of the plant site under the Proposed Action, numerous small unnamed vertical-offset faults have displaced Muddy Creek and younger (Quaternary age—less than 1.7 Ma) alluvial deposits. The local washes at the plant site (discussed in *Section 3.3, Surface Water Hydrology*) are thought to follow the trace of some of these faults, which are fairly evenly spaced (a few hundred to over 1,000 feet apart) and trend between north and north-northwest. Although these local small offsets are potentially active (having experienced movement in recent geologic time), any future displacement is not anticipated to result in a significant earthquake.

The current level of earthquake potential in southern Nevada is relatively low compared to more active parts of the Basin and Range Province (von Seggern and Brune, 2000). No major earthquakes (greater than a magnitude of 6.0) have been recorded within approximately 50 miles of the project area since at least 1868. A magnitude 6.1 quake did occur in 1966 near Caliente, however, approximately 62 miles north of the project area. Seismicity in southern Nevada is dominated by small earthquakes of less than magnitude 4.0, and these events have generally been associated with either the area around the Nevada Test Site (which suggests that those events are from past underground nuclear testing), or around Lake Mead. Small earthquakes near Lake Mead are thought to be related to stress imposed by the filling of the lake (Von Seggern and Brune, 2000).

Earthquake hazard maps developed by the U.S. Geological Survey (USGS) for southern Nevada indicate very low earthquake potential and associated ground acceleration in the vicinity of the project area.

3.2.2.2 Pah Rah Parcel

3.2.2.2.1 Local Geology. Situated near the western margin of the Basin and Range Province, the Pah Rah parcel is essentially the top of a mesa and its surrounding flanks, situated on the southeastern slope of the Pah Rah Mountains, in Washoe County, Nevada. The Pah Rah Mountains are volcanic, and the mesa on the parcel is primarily composed of Tertiary volcanic rocks consisting of basalt and andesite flows that range in age from 6 to 14 Ma, and volcanic rocks of the Pyramid Sequence, which are also primarily basalt of similar age (Green et al., 1991).

3.2.2.2.2 Geologic Faults and Seismicity. The geologic map of the Reno Quadrangle (Green et al., 1991), where the parcel is located, indicates that the Pah Rah Mountains contain numerous

vertical displacement faults that are primarily oriented to the northeast. One such fault runs along the northwestern and northern edge of the parcel, along the northern flank of the mesa. The age and active status of this specific fault are unknown. In addition to the numerous faults within the Pah Rah Mountains, the Truckee River Valley, approximately 5 miles north and east of the parcel, appears to be fault controlled.

Earthquake hazard maps developed by the USGS for Nevada indicate that the potential for ground movement is moderately high in the vicinity of the Pah Rah parcel, but the associated level of ground acceleration is likely to be moderate.

3.3 Surface Water Hydrology

3.3.1 Toquop Area

This section provides context for the subsequent evaluation of potential project-induced environmental consequences to the surface water resources in the project area. Additional hydrologic information is presented in *Section 3.4, Ground Water Resources*.

3.3.1.1 Hydrologic Setting

The project area, which includes the Proposed Action, as well as Alternatives 1, 2, and 3, is located within the Tule Desert and the Virgin River Valley hydrographic areas of the Colorado River Basin (see Map 3-3). All surface water within these areas ultimately flows toward the Colorado River (Lake Mead) via the Virgin River.

3.3.1.2 Local Climate

The arid climate of the project area reflects the desert environment that characterizes much of southeastern Nevada (see the discussion of local climate as it pertains to air resources in *Section 3.6.1.1.1, Climate and Meteorology*). In the higher elevations surrounding the project area the climatic regime transitions from arid to sub-alpine. Table 3-1 summarizes relevant statistics on climatic conditions representative of the project area and surrounding vicinity.

The project area is subject to extreme temperature variations between summer daytime highs, which can exceed 100°F for weeks at a time, and winter nighttime lows, which typically dip well below freezing during December and January.

Of particular importance to the surface water hydrology, however, is the amount and pattern of precipitation. On the local valley floors, and on the lower elevations of the surrounding mountains and hills, the average annual precipitation is significantly less than 10 inches per year (see Table 3-1). This precipitation falls as rain, typically during two different seasons. The greatest amount usually falls during the winter (January to March) as regional cold fronts from the west produce relatively long duration, but low intensity rainfall events. Precipitation is also likely to occur during the summer (July to September) as a result of generally localized, short duration, high intensity convectional storms (thunderstorms fueled by rising warm air masses).

TABLE 3-1
Summary of Climatic Statistics in the Vicinity of the Project Area

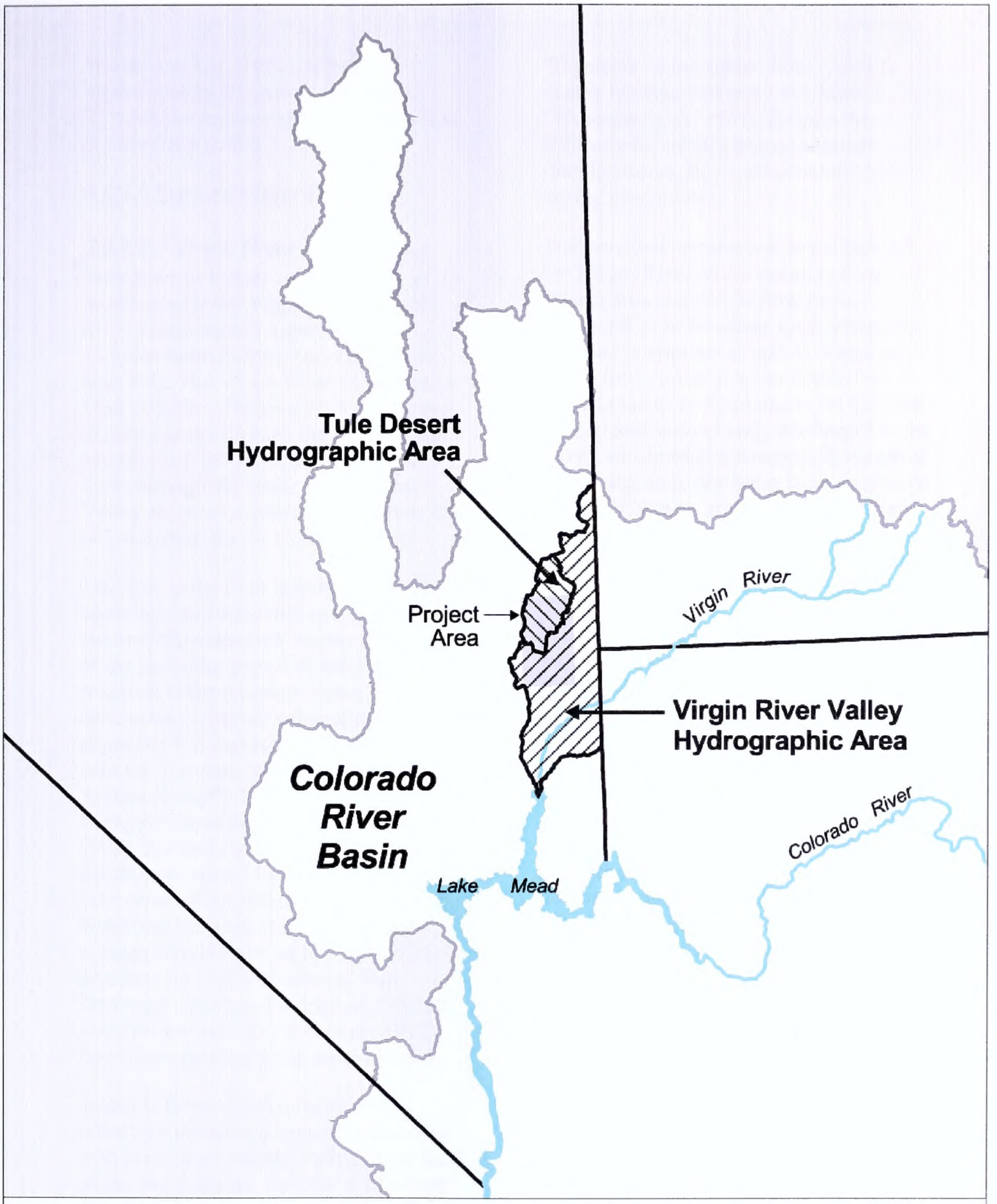
Location	Elevation (feet above mean sea level)	Average Annual Total Precipitation (inches)	Maximum Average Monthly Precipitation and Minimum Average Monthly Precipitation (inches)	Maximum Average Monthly Temperature and Minimum Average Monthly Temperature (°F)
Beaver Dam, Nevada[1] Period of Record: 8/1/1956-12/31/2000	1,900	7.8	1.03 (March) 0.18 (June)	105.6 (July) 31.6 (December)
Mesquite, Nevada[1] Period of Record: 1943-46, 1954-60, 1963	1,600	6.1	No record	No record
Bunkerville, Nevada[1] Period of Record: 12/1/1979-12/31/2000	1,550	6.3	1.03 (January) 0.17 (May and June)	105.5 (July) 28.9 (December)
Elgin, Nevada (SE)[1] Period of Record: 5/1/1965-6/30/1985	3,300	16.8	2.52 (March) 0.14 (June and July)	100.1 (July) 30.7 (December and January)
Elgin, Nevada[1] Period of Record: 3/1/1951-12/31/2000	3,400	14.0	2.21 (February) 0.42 (June)	97.9 (July) 27.7 (December)
Carp, Nevada[2] Period of Record: 1950, 1952-54, 1956, 1962	2,625	4.0	No record	No record

Sources:
[1]Western U.S. Climate Historical Summaries, Western Regional Climate Center, Desert Research Institute, Division of Atmospheric Sciences.
[2]Glancy and Van Denburgh (1969)

With increasing elevation in the mountains that surround the project area, the amount of precipitation generally increases. Areas above 4,000 feet have annual precipitation totals that likely exceed 10 inches (Walker, 2002). Within the watershed of the Tule Desert, the Clover Mountains reach elevations of almost 7,000 feet. The corresponding precipitation amounts in these areas are estimated to average between roughly 13 and 16 inches per year (Walker, 2002).

Surface evaporation rates run counter to local precipitation amounts, and are relatively high. On the local valley floors, the average annual surface evaporation is considerably higher than the average annual rainfall primarily because the generally high air temperatures and the typically low relative humidity in the arid valleys. On the floor of the Virgin River Valley, for example, the annual evaporation rate has been reported by

H:\projects\toquop-water_toquop-water.apr (Hydrographic Areas Layout)



N

0 20 40 60 Miles

Sources: 1:100,000 Vector Linework - BLM Nevada
1:250,000 Hydrologic Units - USGS WRD

Hydrographic Areas in the Vicinity of the Project Area

Map 3-3

CH2MHILL

W012002002BOI

Woessner, et al. (1981), to be approximately 80 inches, or roughly 27 times the average annual precipitation at a similar location.

3.3.1.3 Surface Water Features

3.3.1.3.1 Virgin River. The principal surface water feature in the vicinity of the project area is the Virgin River, which flows southwesterly approximately 13 miles south of the project area (see Map 3-4). The Virgin River originates in Utah near Zion National Park and, upon exiting a gorge through the Beaver Dam Mountains ("the Narrows"), the river flows through the lower Virgin River Valley on its way toward the Overton Arm of Lake Mead on the Colorado River.

The flow in the river is quite variable both seasonally and annually, and differences in the reported values are largely a function of the particular period of record that corresponds to the reported value. The most consistently reported value of the average annual flow is approximately 177,000 acre-feet per year (afy), at Littlefield, Arizona, roughly 9 miles upstream of Mesquite, Nevada (Dixon and Katzer, 2002). A similar value of 174,000 afy for the average annual flow at Littlefield has been reported by Metcalf (1995); and Black and Rascona (1991). However, average annual flows as low as 162,200 acre-feet per year (Glancy and Van Denburgh, 1969) and as high as 193,300 acre-feet per year (Holmes et al., 1997) have been reported at the same location.

Seasonal flows in the river generally reflect the prevailing climatic conditions with peak flows corresponding to the local winter rainy season, the effects of which are typically prolonged by periods of spring snowmelt in the upper portions of the river basin. As a result, approximately 50 percent of the annual flow typically occurs between February and May (Woessner et al., 1981). Despite the tendency for locally intense summer thunderstorms, flows are generally low during the summer.

The principal components to the flow of the Virgin River in the vicinity of the project area include: 1) flow from upstream; 2) inflow from local tributaries; 3) direct precipitation; and 4) irrigation return flow (residual water applied to crops in the river flood plain that infiltrates the soil and subsequently discharges to the river). At Littlefield, Arizona, upstream of the project area, discharge from a series of springs is also an important component of flow in the Virgin River. These springs are discussed further in *Section 3.4, Ground Water Resources*.

Within the lower Virgin River Valley, the only perennial tributary of the Virgin River is the Beaver Dam Wash (Map 3-4), which joins the Virgin River just upstream of Littlefield. Although the Beaver Dam Wash is perennial along several reaches, little or no surface flow actually occurs at the confluence with the Virgin River most of the year. Estimated annual discharge rates for this wash are highly variable, but the long-term (1970 to 1994) annual average is roughly 12.5 cubic feet per second (cfs) or 9,000 acre-feet per year (Holmes et al., 1997).

All other tributaries to the Virgin River within the lower Virgin River Valley are ephemeral washes, which only flow for short periods in response to significant rainfall events. In the vicinity of the project area, the washes capture surface runoff from the Tule Springs Hills, the Tule

Desert, and the Mormon and East Mormon mountains, and flow generally southward

toward the river. Although approximately six named washes in the vicinity of the project area drain into the Virgin River (see Map 3-4), the Toquop Wash and its tributaries, discussed below, are the most important within the project area.

As it proceeds toward Lake Mead, flow in the Virgin River decreases as a result of: 1) consumptive use (through irrigation and other agricultural water demands); 2) evapotranspiration (the combined effect of direct evaporation and transpiration by natural vegetation along the river); and 3) infiltration into the local ground water system (Glancy and Van Denburgh 1969; Woessner et al. 1981; Black and Rascona 1991).

Specifically, portions of the Virgin River are diverted for irrigation at Mesquite, Bunkerville, and Riverside. These three diversions are estimated to reduce the river flow collectively by approximately 20 percent or 38,000 acre-feet per year (Woessner et al., 1981). Historically, this has meant that some of the time all of the available water has been diverted during periods of low flow (June through August).

These diversions, together with evapo-transpiration and infiltration, cause the river to lose flow as it makes its way toward Lake Mead because essentially no water enters the river downstream of the Beaver Dam Wash and the Littlefield springs, apart from seasonal inflows from the ephemeral washes such as Toquop, and return flows from excess irrigation water. Specific studies on the interaction between ground water and the Virgin River have concluded that, between Littlefield and its confluence with Lake Mead, the river basically is "losing" flow (water from the river infiltrates the subsurface and recharges ground water, as opposed to a "gaining" river, which receives inflow from ground water) (Glancy and Van Denburgh, 1969; Woessner et al., 1981; Metcalf, 1995; Las Vegas Valley Water District, 1992). Further discussion on the ground water/ surface water interaction in the Virgin River Valley is presented in *Section 3.4, Ground Water Resources*, and CH2M HILL (2002b).

Compared with the average flow at Littlefield (177,000 acre-feet per year, see above), the Virgin River at its mouth in the Overton Arm of Lake Mead was estimated to be approximately 80,000 acre-feet per year by Glancy and Van Denburgh (1969). They further report that, very little, if any, of this Virgin River flow reaches Lake Mead during the summer. Actual reported data at the mouth of the river, however, are limited. A single measurement of flow of approximately 24 cubic feet per second (cfs) was reported by Metcalf (1995) in October 1992. In addition, an average value of flow of 138,420 acre-feet per year was reported by Woessner et al. (1981), based only on data from June 1980 to May 1981. This value of flow is approximately 86 percent of the value of flow at Littlefield over the same period.

3.3.1.3.2 Tule Desert and Toquop Wash. The proposed plant site under Alternative 2, and the wellfield under all project alternatives, are within the Tule Desert hydrographic area (Map 3-4). All surface drainage from the Tule Desert, and ultimately from all other portions of the project area, is carried by the Toquop Wash, which flows south-southeast to the Virgin River.

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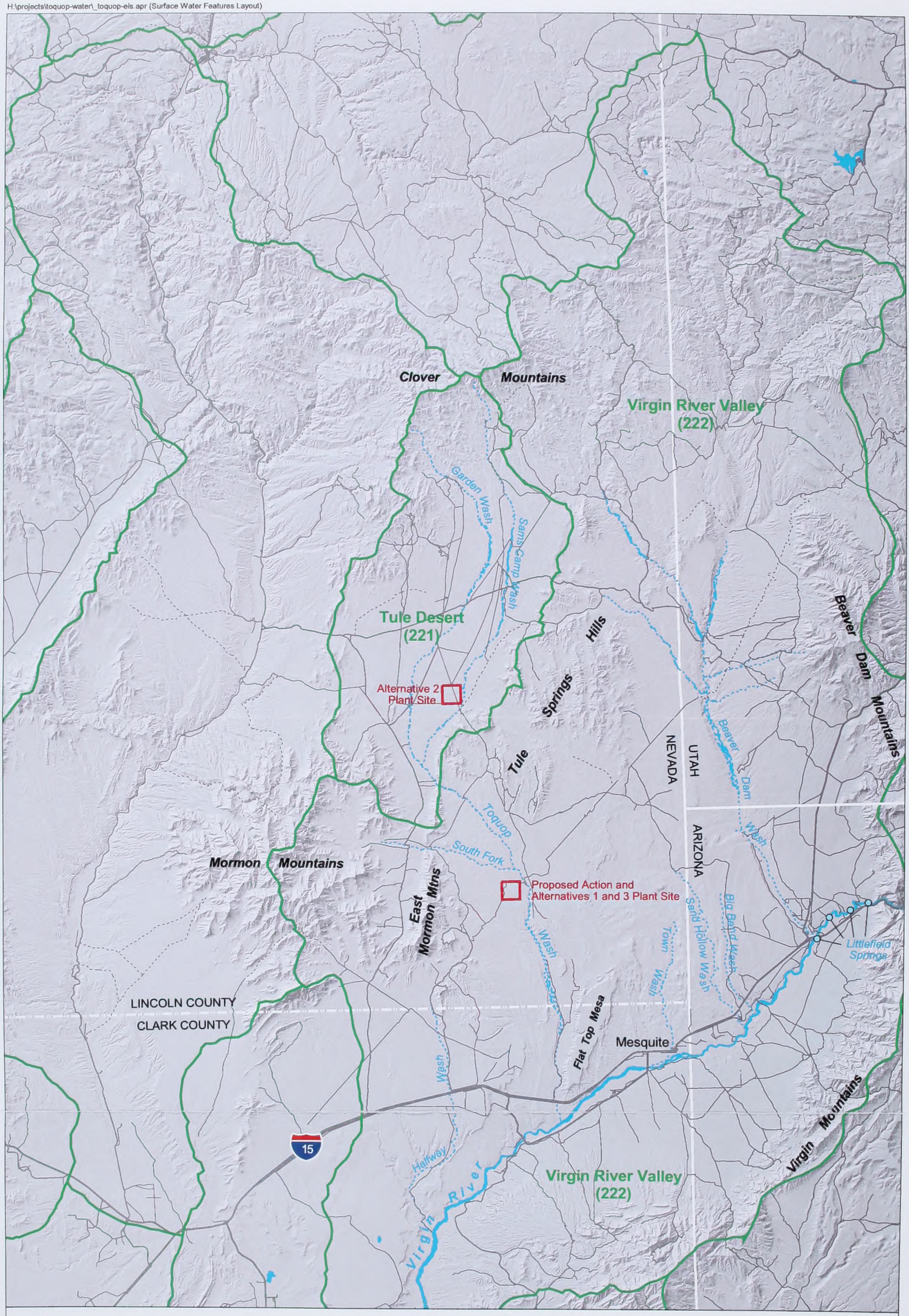

N

0 5 10 Miles

Legend

- Hydrographic Boundary
- Wash or Ephemeral Drainage
- Waterbody
- Road
- Trail

Sources: 1:100,000 Vector Linework - BLM Nevada
USGS National Elevation Dataset

Surface Water Features in the Vicinity of the Project Area

Map 3-4

CH2MHILL

Within the Tule Desert, numerous small unnamed washes direct localized surface runoff into progressively larger tributaries of the Toquop Wash. Two of the larger tributaries of the Toquop Wash within the Tule Desert are Garden and Sam's Camp washes, which both originate at the base of the Clover Mountains (see Map 3-4).

As with all of the other tributaries to the Virgin River below Littlefield, the Toquop Wash is ephemeral and flows only for short durations as a result of significant precipitation events. Although flow of the Toquop Wash has not been directly quantified, it has been estimated by Glancy and Van Denburgh (1969) to contribute an average of approximately 1,400 acre-feet per year to the Virgin River.

3.3.1.3.3 Local Springs. Several small springs are located in the mountains and hills that surround the project area. The discharge from these springs, however, does not contribute to surface flows in the Toquop Wash or any of its tributaries. The discharge from these springs typically is very low (all are less than 1 gallon per minute [gpm] and most are less than half that rate), and if not captured for stock water, either evaporates directly or soaks into the ground where it subsequently evaporates or is lost through transpiration by plants. Similarly, these springs do not contribute to flows in the Virgin River. Further identification and discussion of these springs is presented relative to ground water resources in *Section 3.4, Ground Water Resources*.

3.3.1.3.4 Proposed Action Plant Site. Six small, parallel, unnamed washes, spaced approximately 1,000 feet apart, direct surface runoff southeast toward a larger unnamed tributary wash, which joins the Toquop Wash approximately 1 mile southeast of the plant site.

Approximately 1 mile north of the plant site, the South Fork Toquop Wash joins the Toquop Wash (see Map 3-4). The South Fork is the largest tributary of the Toquop Wash, and drains much of the eastern Mormon Mountains and the northern East Mormon Mountains.

3.3.1.4 Relevant Floodplain Delineation

The entire project area is located within a Zone D Floodplain, as defined by the Federal Emergency Management Agency (FEMA) floodplain maps. Zone D floodplains are defined as "areas of undetermined, but possible, flood hazards" (Map Index Community Panel Number 3200140001-5525). As a result, no portion of the plant site under the proposed action is actually within a specified floodplain.

3.3.1.5 Water Quality

The Virgin River is generally characterized by high concentrations of total dissolved solids (TDS) on the order of 1,000 to 3,000 milligrams per liter (mg/L) (Glancy and Van Denburgh 1969; Woessner et al 1981). Composed mainly of calcium, sodium, sulfate, and chloride, the concentration of TDS shows a strong inverse correlation with the flow of the river. Concentrations of TDS are most dilute when flows are the highest, and tend to increase during periods of low flow. During low-flow periods, the flow in the river is dominated by discharges from springs with high TDS concentrations and irrigation return flows, which also tend to concentrate salts. In addition, because the quantity of irrigation return flows increases with distance downstream along reaches where irrigated agriculture is

present, the concentration of TDS has similarly been shown to increase with distance downstream for the same reaches (Glancy and Van Denburgh, 1969; Woessner et al., 1981). Specifically, a 30 percent increase (between 2,000 mg/L and 2,700 mg/L) in TDS concentration between Littlefield and Riverside was reported by Glancy and Van Denburgh (1969).

In addition to dissolved minerals, the Virgin River carries a large quantity of suspended solids that gives it its characteristic muddy appearance. The material in suspension is largely silt- and clay-sized particles, while the transported material along the river bed is largely sand-size. The average annual quantity of suspended material passing by Littlefield is reported to be 2.7 million tons, with the minimum reported value being less than 1 million tons and the maximum value over 6 million tons (Glancy and Van Denburgh, 1969).

3.3.2 Pah Rah Parcel

The climate of Washoe County, where the Pah Rah parcel is located, is mild with low humidity and rainfall and characterized as semi-arid to arid. Although the Pah Rah parcel is located within the Truckee River Basin, there are no surface water features at or near the parcel including any significant ephemeral drainages or springs. The Truckee River, which flows west to east before turning north and terminating at Pyramid Lake, is approximately 1.5 miles north of the parcel and is not connected to the parcel.

3.4 Ground Water Resources

This section provides context for the evaluation of potential project-induced environmental consequences to the local ground water resources in the project area. The ground water environment, both regional and local to the project area, is directly linked to the geological conditions described in *Section 3.2, Soils and Geology*. The relationship between ground water and surface flows in the Virgin River is also discussed in this section as it relates to potential project-induced impacts. A separate technical report on the regional and local hydrogeology, the *Water Resources Technical Report* (CH2M HILL, 2002b) has been prepared. The report provides more detailed discussion and analysis of many of the ground water related topics presented in this EIS.

3.4.1 Regional Conditions

3.4.1.1 Setting

The project area is located within the Tule Desert and Virgin River Valley hydrographic areas (see Map 3-5), within the Basin and Range physiographic province (see *Section 3.2, Soils and Geology*).

The Tule Desert is the location of the wellfield in the Proposed Action. Elongated in a generally north-northeast direction, the Tule Desert is a singular topographic basin that is surrounded by the Clover Mountains to the north and northwest, the Tule Springs Hills to the east, and the East Mormon and Mormon mountains to the south and southwest, respectively. Covering an area of approximately 125,000 acres, the Tule Desert is approximately 32 miles long and 12 miles across. The floor of the Tule Desert slopes from all directions toward the Toquop Gap, which separates the East

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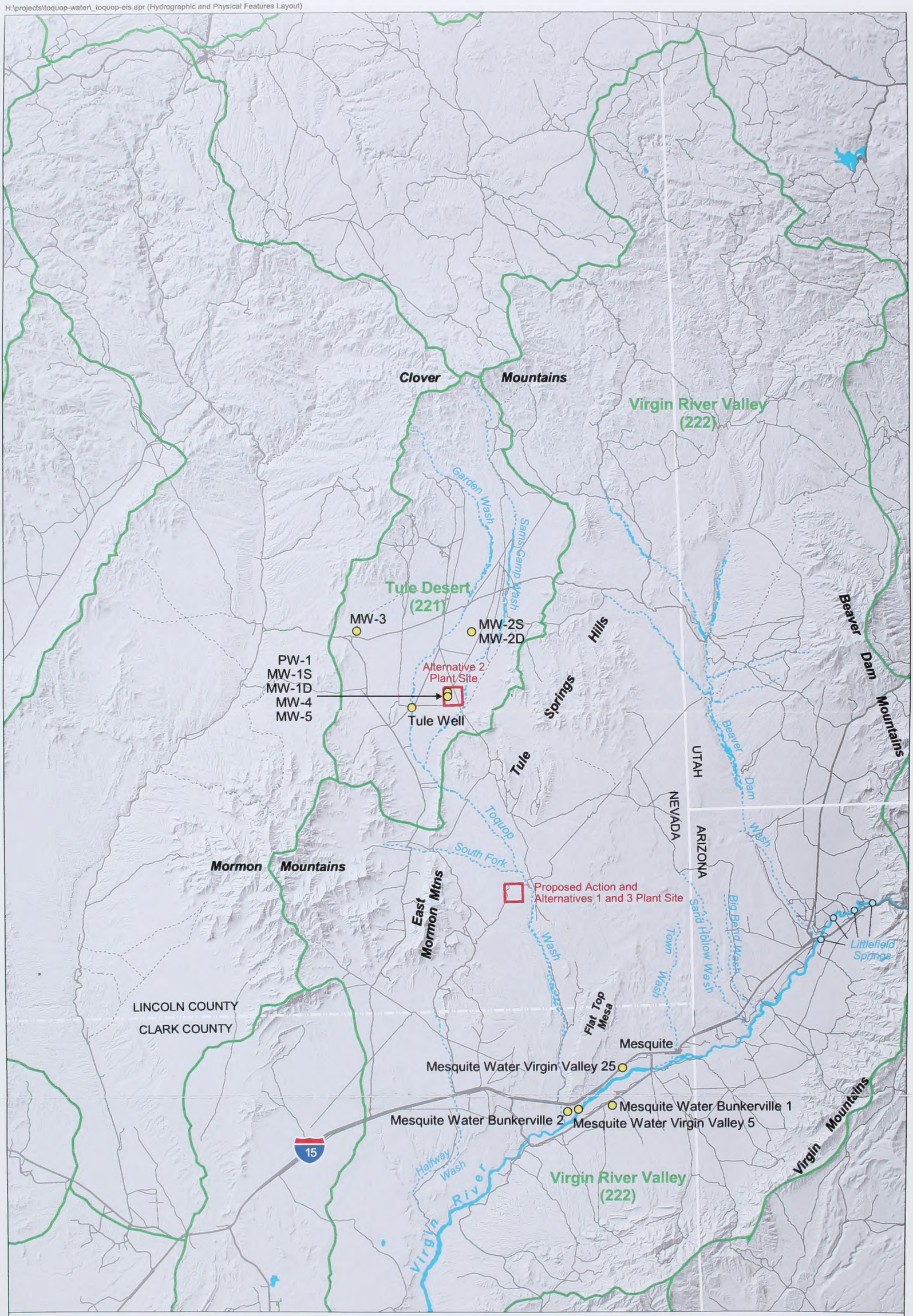


N

0 5 10 Miles

Sources: 1:100,000 Vector Linework - BLM Nevada
USGS National Elevation Dataset

Legend

- Hydrographic Boundary
- Wash or Ephemeral Drainage
- Waterbody
- Existing Well
- Road
- Trail

Hydrographic Areas and Physical Features in the Vicinity of the Project Area

Map 3-5

CH2MHILL

Mormon Mountains from the Tule Springs Hills. The Toquop Gap forms the only natural hydrologic outlet from the Tule Desert, and it is through this low-lying area that the Toquop Wash drains ephemeral surface water runoff from the Tule Desert (see *Section 3.3, Surface Water Hydrology*).

The plant site under the Proposed Action is located within the Virgin River Valley, which abuts the Tule Desert to the north and similarly forms a singular topographic basin in which all surface water drainage is toward the Virgin River and Lake Mead. Technically, the Virgin River Valley extends from the Tule Desert east to the Beaver Dam Mountains in Utah and south to the Virgin Mountains in Arizona. Geologically, much of the Virgin River Valley sits above a deep tectonic basin in which the underlying bedrock is as much as 6 miles below the valley floor (see *Section 3.2, Soils and Geology*).

3.4.1.2 Ground Water Occurrence

3.4.1.2.1 Basin and Range Province.

Within the Basin and Range Province, ground water occurs in both the sediments that have filled the valleys to their current elevations (basin-fill deposits) and the underlying rock that also comprises the surrounding hills and mountains. In the Tule Desert and Virgin River Valley, ground water is, therefore, stored and conveyed through two principal aquifer systems: 1) saturated, poorly consolidated basin-fill deposits, consisting mainly of silty and clayey sands with occasional clay and gravel layers, locally represented by the Muddy Creek Formation (see *Section 3.2, Soils and Geology*); and 2) the underlying fractured sedimentary (for example, limestone, dolomite) or volcanic rocks.

In the Basin and Range Province, some basin-fill aquifer systems are localized and relatively shallow. Ground water in these deposits generally flows in directions that coincide with decreasing ground-surface elevations (that is, "downhill"). Ground water can flow between hydrographic areas, or basins, where the basin-fill deposits from adjacent areas merge, such as at the Toquop Gap where the basin-fill deposits of the Tule Desert are continuous with those of the Virgin River Valley.

The underlying fractured-rock aquifer systems, on the other hand, are regional features in which ground water flows irrespective of the local topography and hydrographic-area boundaries. Ground water in the deep fractured-rock systems flows in response to regionally controlled hydraulic gradients driven by regional recharge and discharge areas, and is generally not significantly influenced by conditions in the overlying basin-fill aquifer systems. In addition, although individual rock formations are laterally discontinuous and typically highly deformed structurally, the basic rock types are essentially continuous and transcend the boundaries of the hydrographic areas. As a result, it is very difficult, if not impossible, to place lateral bounds around the fractured-rock aquifer systems. Further discussion on the basic principles of flow through fractured rock is presented in CH2M HILL (2002b).

3.4.1.2.2 Carbonate-Rock Province.

As described in *Section 3.2, Soils and Geology*, a substantial portion (approximately 200 million years) of the geologic history of this part of the Basin and Range Province involved the deposition of massive sequences of carbonate rocks (limestone and dolomite) over a wide area of present-day eastern Nevada, western Utah, and the

northwestern tip of Arizona. Because such a large area has this common geologic past as much as 50,000 square miles in Nevada alone, this portion of the Basin and Range Province is also commonly referred to as the carbonate-rock province (Mifflin and Hess, 1979; Dettinger et al, 1995; Prudic et al., 1995).

Inasmuch as the carbonate-rock province is a descriptive term primarily used by hydrogeologists, its definition also includes a reference to ground water. Specifically, Dettinger et al. (1995) describe the carbonate-rock province as, "...that part of the Basin and Range Province in which ground water flow is predominately or strongly influenced by carbonate-rock aquifers of Paleozoic age."

According to Dettinger et al. (1995, Figure 1) and Plume (1996, Figure 2), the Tule Desert and Virgin River Valley hydrographic areas are located just within the southeastern edge of the carbonate-rock province. However, as discussed in *Section 3.4.2, Local Conditions*, Paleozoic carbonate rocks, while they comprise a significant portion of the local mountains and hills that rim the Tule Desert, do not necessarily comprise the shallowest fractured-rock aquifer formations within the Tule Desert and Virgin River Valley hydrographic areas.

Dominated by limestones and dolomites, the carbonate rocks in this region are brittle and subject to fracturing, and under the right geochemical conditions can dissolve and form cavities that further enhance the ability of these rocks to store and transmit ground water. The large geographic area underlain by these carbonate rocks, together with their demonstrated capacity to transmit large volumes of ground water, is evidence that the carbonate rocks of Nevada comprise aquifer systems of regional scale and significance (Dettinger et al., 1995).

Because of their significance, the aquifer systems of the carbonate-rock province have been studied extensively on a regional scale by the U.S. Geological Survey (USGS) (Harrill and Prudic, 1998). Computer models of the regional carbonate aquifer systems developed by the USGS indicate that the total volume of ground water that flows through these aquifers over the entire carbonate rock province is about 1.5 million acre-feet per year (afy), based on fairly sparse data. Specifically, within the Nevada portion of the Colorado River Basin, the flow through the carbonate aquifer is estimated by the USGS to be more than 200,000 afy. These estimates are based on very general assumptions for conditions in the Tule Desert and Virgin River Valley for which there were no available data on the carbonate rock aquifer system in these areas at the time of those analyses.

3.4.2 Local Conditions

3.4.2.1 Tule Desert Hydrogeology

General descriptions and inferences on the hydrogeologic conditions of the Tule Desert area are found in the published literature dating back to the early 20th century (for example, Carpenter [1915]). Until recently, however, very little specific data were available because the ground water resources of the Tule Desert have been only minimally developed.

As part of the investigation of the feasibility of using ground water from the Tule Desert for the proposed power plant alternatives, several monitoring wells (MW-1 through MW-5) and one pilot production well (PW-1) have been installed, sampled, and tested in the area of

the proposed wellfield (see Map 3-5). MW-1 and MW-2 consist of nested wells (one well screened in the basin fill [shallow] and one well screened in the fractured rock [deep]) within a common borehole. MW-3 and MW-4 are individual monitoring wells screened in the fractured rock, and MW-5 is screened in the basin fill. Much of the information presented in this section comes from that fieldwork, the details of which are presented in CH2M HILL (2002b).

3.4.2.1.1 Ground Water in the Basin-Fill. Based on the logs of boreholes drilled in the wellfield area, the basin-fill in the Tule Desert consists of older alluvium of probable Pleistocene age (approximately 10,000 to 1.7 million years old [Ma], and perhaps Pliocene age [approximately 1.7 to 5 Ma]), that was deposited as erosional debris from the surrounding up-faulted areas (see *Section 3.2, Soils and Geology*). Although these deposits consist principally of unconsolidated coarse sands and gravel with some silt and clay within the uppermost 100 to 200 feet, they typically transition rapidly thereafter to a massive sequence dominated by either silty or clayey sands that is 300 or more feet thick. In some locations, layers of coarse-grained sediments (silty sands and gravel) and layers of clay occur at depths of 600 feet or more (CH2M HILL, 2002b).

In addition, the available data suggest that although a general pattern to the layering is discernable, discrete layers within the basin-fill deposits are laterally discontinuous. Consequently, although the lower portions of the basin-fill are saturated, a single continuous aquifer unit is difficult to identify. In addition, ground water is likely to be locally perched (that is, it occurs as laterally discontinuous pockets of saturated sediments that are independent of a specific basin-fill aquifer).

Further evidence of the complexity of the ground water conditions within the basin-fill deposits comes from the available ground water-level data. In addition to revealing that the depth to ground water in the basin-fill is generally very deep, the water-level data also confirm the likelihood of more than one ground water-containing zone within these deposits (for example, perched ground water). Specifically, the available data reveal depths to ground water (as of February 2002) of approximately 390 feet (Tule Well), 496 feet (MW-2 [shallow]), and 718 feet (MW-5).

Results from geophysical studies reported in Langenheim et al. (2001) indicate that the thickness of the basin-fill deposits generally increases toward the center of the Tule Desert. The results in Langenheim et al. (2001), however, also suggest that the top of the fractured rock is highly irregular with localized ridges and depressions. This is confirmed by the logs from the test borings in the wellfield area that indicate that the top of consolidated rock occurs at depths of between roughly 800 feet (MW-3) and 850 feet (MW-1, MW-4, and PW-1) to 1,200 feet (MW-2). These depths indicate that the maximum saturated thickness of the basin-fill deposits is similarly quite variable, ranging from approximately 132 feet at MW-5 to 700 feet at MW-2.

The total volume of ground water in storage within the uppermost 100 feet of saturated sediments in the Tule Desert has been estimated by NDWR (1971) to be approximately 530,000 acre-feet, based on a specific yield of 10 percent.

Recharge to ground water in the Tule Desert basin-fill deposits comes from direct precipitation on the surrounding upland areas, particularly those portions of the Clover Mountains and Tule Springs Hills that are within the watershed of the Tule Desert. Precipitation in these areas percolates down through the subsurface and reaches ground water in amounts proportional to elevation (that is, as elevation increases, so does the proportion that precipitation contributes to recharge).

Consistent with the approach most commonly taken in the hydrologic literature (Maxey and Eakin, 1949; Glancy and Van Denburgh, 1969; Prudic et al., 1995), precipitation that falls on the valley floor is conservatively assumed not to infiltrate and recharge ground water primarily because of the high potential for evaporation (see *Section 3.2, Surface Water Hydrology*). Dixon and Katzer (2002), however, believe that significant ground water recharge occurs through the infiltration of runoff in the principal ephemeral washes that feed the Toquop Wash (as well as from the Toquop Wash itself).

Specific estimates of ground water recharge in the Tule Desert vary from 2,100 afy (Glancy and Van Denburgh, 1969) to approximately 8,968 afy (Katzer et al., 2002). Recharge to the basin-fill deposits could also be occurring through upward leakage from the underlying fractured-rock aquifer, but this potential recharge component has not been quantified. The potential for interconnection between ground water in the basin-fill and the underlying rock is addressed further in the section below and in CH2M HILL (2002b), which also contains further elaboration on recharge estimates.

Within the Tule Desert, ground water is believed to flow through the basin-fill deposits toward the Toquop Gap, where some portion of the basin-fill ground water leaves the Tule Desert hydrographic area and enters the Virgin River Valley hydrographic area. The Toquop Gap, however, is too small to accommodate all of the basin-fill ground water discharge that, along with current local withdrawals and locally recharged spring flows, must balance the recharge estimates (that is, high-end estimates of the range of potential discharge rates through the basin-fill deposits in the Toquop Gap are much less than 10 afy [CH2M HILL, 2002b]). Therefore, some ground water in the basin-fill deposits must enter the underlying fractured-rock aquifer system and flow into the Virgin River Valley through that medium.

3.4.2.1.2 Ground Water in the Fractured Rock. The structural complexity that is evident in the surrounding Tule Springs Hills is mirrored, to a certain degree, in the fractured-rock that underlies the Tule Desert basin-fill deposits. Accordingly, the specific composition of the fractured-rock aquifer in the Tule Desert varies laterally across the basin as a result of vertical offset from faulting and local deposits of volcanic.

Detailed descriptions of the rocks encountered in the test boreholes in the proposed wellfield area are presented in CH2M HILL (2002b). In general the upper-most rock formation encountered is predominately composed of gray limestone interfingered with brown and red limey siltstone and bands of gray quartzite down to a depth of 2,000 feet in the vicinity of PW-1, MW-1, and MW-4. To the north, in the vicinity of MW-2, the

limestone component is generally absent and the limy siltstone component predominates.

The composition of the bedrock in the vicinity of PW-1, MW-1, and MW-4 is generally consistent with descriptions of the Triassic-aged (205 to 240 Ma) Moenkopi Formation as reported in the geologic literature (Tschanz and Pampeyan, 1970; Plume, 1996). The siltstone component is also similar to outcrops of the Moenkopi Formation in the Tule Springs Hills just east of the wellfield area (see Map 3-2). The Moenkopi is identified as being the uppermost (youngest) formation that contains aquifers in carbonate rock (Plume, 1996, Table 1). This is consistent with the predominance of limestone encountered in the boreholes in the vicinity of PW-1 and is supported by local water chemistry data, discussed below, which indicate that ground water from the fractured rock at the location of PW-1 and MW-4 is directly related to ground water in the regional carbonate aquifer system.

To the west at MW-3, Tertiary aged volcanic rocks are present to a depth of 2,000 feet. These volcanic rocks are part of the Clover Mountains, and include discrete layers of basalt, rhyolite, and tuff, interspersed with layers of clay up to 200 feet thick. These volcanic rocks likely extend under much of the northern third of the Tule Desert, and also likely comprise the bedrock beneath the basin fill south of the northern third of the Tule Desert along the eastern edge of the Clover Mountains.

All of the rock types encountered in the boreholes (limestone, siltstone, quartzite, and the various volcanic rocks) show evidence of fracturing, thus providing the void space to store and transmit ground water.

Despite the variation in the rock types that comprise the fractured-rock aquifer within the Tule Desert, ground water chemistry data, discussed in *Section 4.2.1.3, Ground Water Quality*, indicate a common ground water flow system within the different rock types, except at MW-3, as discussed below. For example, values of deuterium (a stable isotope of hydrogen contained in water molecules), which are used to help differentiate between waters of different origins (see CH2M HILL, 2002a; *Appendix A*), indicate similarities between ground water in an upgradient well MW-2 (deep), where fractured siltstone dominates, and ground water in downgradient wells PW-1 and MW-4, where carbonate rocks dominate. In both rock types, the ground water is highly depleted in deuterium. Specifically, deuterium values range from -98 per mil in MW-2 (deep) to -103 per mil in MW-4.

In addition, these water chemistry data also indicate a linkage between the ground water in the Tule Desert fractured-rock aquifer and regional carbonate-aquifer ground water. Along with being highly depleted in deuterium, the chloride concentrations are very low (approximately 8 mg/L) in both PW-1 and MW-4. The chloride data for MW-2 (deep) are considered to be unreliable (CH2M HILL, 2002a). These data collectively comprise a unique chemical signature that is only duplicated in ground water of the regional carbonate-aquifer system, which is similarly highly depleted in deuterium and typically does not provide a source of chloride (CH2M HILL, 2002a).

Further evidence that ground water in the fractured rock that underlies the Tule Desert basin-fill is part of the regional aquifer system of the carbonate-rock province comes from carbon-14 (C-14)

data. The application of C-14 data, which have been widely used for several decades to date items and substances containing carbon, is presented in CH2M HILL (2002a), *Appendix A*. The C-14 data from PW-1 indicate that the ground water in the fractured-rock at this location is very old because the unstable carbon content has almost completely decayed (0.9 percent modern carbon). In other words, the ground water from PW-1 originated as precipitation many tens of thousands of years ago and has taken that long to travel to the point where it could be extracted by PW-1. Ground water of this age is consistent with the age of ground water in the regional carbonate-aquifer system, which similarly requires several thousand years to flow from the point of recharge across the carbonate-rock province.

Table 3-2 presents water-level data from fractured-rock wells in the Tule Desert.

These data indicate that water levels in wells that penetrate the fractured rock are typically very deep, but remain above the top of rock—further indicating that the ground water in the fractured rock is

TABLE 3-2
Ground Water Levels in the Fractured-Rock Aquifer in the Tule Desert

Well	Screened Interval (feet below surface)	Depth to Water (feet)	Water Level Elevation (feet above mean sea level)	Date
PW-1	1,000 to 1,160	724.2	2495.8	February 17, 2002
	1,200 to 1,240			
	1,340 to 1,380			
	1,440 to 1,480			
	1,500 to 1,520			
	1,540 to 1,560			
	1,580 to 1,780			
MW-2	1,435 to 1,540	506	3044	November 20, 2001
MW-3	920 to 960	484	3036	February 16, 2002
	1,000 to 1,060			
	1,100 to 1,140			
	1,480 to 1,520			
	1,700 to 1,760			
	1,800 to 1,840			
	1,920 to 1,980			
MW-4	1,108 to 1,148	718	2501	February 27, 2002

confined under pressure. This conclusion that the ground water is under pressure in the fractured rock is confirmed by the water level data from immediately adjacent basin-fill wells. These data reveal water levels that are different than the water levels in the rock.

When displayed spatially on a map, the water-level data from fractured rock also indicate that the horizontal component of the hydraulic gradient within the fractured rock is oriented in a southerly direction within the Tule Desert (CH2M HILL, 2002b). The magnitude of the horizontal component of hydraulic gradient is approximately 0.02, which is very steep but consistent with the relatively poor ability of the fractured rock to transmit water as discussed below.

Although the direction of ground water flow is dictated locally by the orientation of individual fractures, the direction of ground water flow is considered to be generally parallel to the direction of hydraulic gradient at the scale of the entire hydrographic area. In other words, the available water-level data indicate that ground water flows south through the Tule Desert.

These results are consistent with the findings of regional studies on the carbonate-rock aquifer systems that have concluded that the regional ground water flow in the fractured-rock aquifer is generally south in the vicinity of the Tule Desert and the northern portions of the Virgin River Valley hydrographic areas (Harrill and Prudic, 1998; Dettinger, 1992; Prudic et al., 1995).

Unlike ground water in the basin-fill deposits, ground water in the fractured rock is recharged in part outside the hydrographic area. Comparisons of water-chemistry data from springs and wells north of the Tule Desert with similar data from the test wells in the proposed wellfield area indicate that ground water enters the Tule Desert fractured-rock aquifer north of the Clover Mountains.

Specifically, as mentioned above, the chemical signature of the ground water in the fractured rock at PW-1 and MW-4 is unique and is defined by the combination of highly depleted deuterium values (-103 per mil) and very low chloride concentrations (approximately 8 mg/L). Ground water from MW-2 (deep) is also highly depleted in deuterium (-98 per mil), but reliable chloride data from this fractured-rock well are unavailable.

The deuterium is indicative of ground water that originated (that is, was recharged) in a relatively cold, probably high altitude environment, much higher than any of the mountain areas that surround the Tule Desert including the Clover Mountains (CH2M HILL, 2002b).

Chloride concentrations in ground water typically only increase as ground water gains chloride ions from the fractured rock through which it flows. Carbonate rocks, however, are typically low in chloride and would not provide a source of chloride ions to ground water that flows through them. In addition, because chloride ions in ground water do not readily exchange with other anions in the rock, chloride concentrations in ground water typically do not decrease with distance along the path of flow. Accordingly, the low chloride concentrations in the vicinity of PW-1 and MW-4 is consistent with ground water that was recharged in a low chloride environment and stayed in such an environment (including carbonate and volcanic rocks) throughout its journey through the subsurface.

This combined (depleted deuterium/very low chloride) chemical signature is currently only known to exist in carbonate springs (Flat Nose, Delmues, and Bennett) in Dry Valley and Panaca Valley approximately 30 miles north of the northern edge of the Tule Desert hydrographic area. Ground water recharge to the Tule Desert must therefore involve southerly inter-basin ground water flow from Dry Valley through eastern Panaca Valley and eastern Clover Valley before entering the Tule Desert though faults and fractures in the subsurface volcanic rocks of the Clover Mountains.

In addition, the extremely low C-14 results (0.9 percent modern carbon) in PW-1, mentioned above, which is indicative of very old ground water, further support the premise that recharge to the fractured-rock aquifer in the Tule Desert occurred several miles north of the Tule Desert hydrographic area.

The data used to support these conclusions were obtained from Thomas et al. (2001) and Hydrosystems Inc. (2001), and are presented and analyzed in CH2M HILL (2002b).

Several conclusions about the ground water environment can be drawn based on the results of aquifer testing in the wellfield area, as described in CH2M HILL (2002b). The first conclusion is that the ability of the fractured-rock aquifer in the vicinity of PW-1 to transmit water (aquifer transmissivity) is relatively low. Specifically, the values of transmissivity for the fractured-rock aquifer obtained by pumping PW-1 were found to range between 14,500 and 27,000 gallons per day per foot of aquifer thickness (gal/day/ft).

Aquifer transmissivity, together with the magnitude of the horizontal component of hydraulic gradient, enables the amount of ground water flowing through the aquifer to be estimated by multiplying the product of these two parameters by a representative value of the width of the aquifer. Accordingly, using a representative value of transmissivity (14,500 gal/day/ft, which is the lowest value calculated), together with the observed hydraulic gradient (0.02), and an assumed minimum representative value for the width of the Tule Desert for which these parameters apply (20,000 feet or approximately 3.8 miles), the flow through this portion of the Tule Desert (that is, in the vicinity of PW-1) is roughly 6,500 afy (CH2M HILL, 2002b).

Within the Tule Desert outside of this 4-mile wide width, the parameters in the aforementioned calculation are represented by other unknown values; consequently, ground water also flows within the Tule Desert fractured-rock aquifer outside and parallel to the 4-mile wide width selected for the calculation above. This additional amount (which would raise the total above 6,500 afy), however, cannot be reasonably calculated at this time.

In addition, significant additional ground water undoubtedly flows beneath the Tule Desert at depths deeper than that for which the transmissivity value obtained from PW-1 is representative and not included in the estimate above. PW-1 is approximately 1,800 feet deep (see Table 3-2) and additional unquantifiable amounts of ground water flows within deeper fractured-rock aquifer units (for example, deep Paleozoic carbonate rocks not encountered within the depths drilled to date) beneath the Tule Desert. This premise is supported by the existence of very deep (that is between 3,400 and 10,000 feet deep) wells that are reported to

penetrate the regional Paleozoic carbonate aquifer system (Dettintger et al., 1995, Table 6).

The ability of the aquifer to store ground water (storativity) was also determined from the aquifer tests. Values of storativity, which is the volume of water pumped by a well, per foot of water-level decline, per unit area of the fractured-rock aquifer, have been calculated to range between approximately 0.005 and 0.012. Small values of this order of magnitude indicate that pumping results in very little loss of ground water from storage and confirms the observation that the ground water is confined under pressure within the fractures of the rock. Based on the value of 0.005 for aquifer storativity, the volume of ground water within the uppermost portion (that is, an aquifer thickness of no more than 1,000 feet) of the fractured-rock aquifer is estimated to be approximately 400,000 acre-feet (CH2M HILL, 2002b).

The aquifer tests also revealed that water levels in the rock and overlying basin-fill deposits behave very similarly in response to pumping, although with much less water-level decline in the basin fill. As a result, it appears that there is significant hydraulic interconnection between the two aquifers, and that they effectively act as one unit at the scale of the wellfield area. In the vicinity of PW-1 and MW-4, the vertical component of hydraulic gradient is slightly upward, implying that ground water has a slight tendency to flow from the rock upward into the basin-fill deposits in this area.

Farther to the north and laterally upgradient, however, the vertical gradient is downward at MW-2. The downward gradient implies that ground water tends to flow from the basin-fill deposits into the fractured rock at this location. Therefore, although the results of aquifer testing indicate that ground water in the basin fill and ground water in the fractured-rock aquifer responds to pumping essentially as a unit, ground water in the two aquifers originates from different sources and flows differently, if not independently, through the Tule Desert.

Available water-chemistry data indicate that within the Tule Desert the ground water in the basin fill and ground water in the fractured-rock aquifer have different chemical compositions that reflect different origins. Specifically, ground water in the fractured rock in the vicinity of PW-1 and MW-4 is chemically similar to the regional carbonate-rock aquifer system (for example, highly depleted deuterium, very low chloride, very low C-14, and no detectable tritium [an unstable isotope of hydrogen]). Tritium, if detected, is indicative of water less than 50 years old because tritium in precipitation originated with aboveground nuclear testing. Ground water in the basin-fill (based on data from the Tule Well and MW-5), however, is on the whole less depleted in deuterium, higher in chloride and has detectable tritium.

The results of the aquifer testing also provide insight into how much water individual wells can pump (well yield). Although PW-1 was found to sustain a pumping rate as high as 1,400 gpm for several days, the resulting water-level response indicates that long-term sustained rates of more than approximately 550 gpm are not practical for PW-1. Because of the spatial variability (heterogeneity) of the fractured-rock aquifer, the long-term yield of other wells could be more or less than 550 gpm.

3.4.2.1.3 Springs. Numerous small springs discharge ground water both within and around the Tule Desert (see Map 3-6). Most of these springs are in the Clover Mountains, but a few are located in the Tule Springs Hills and the East Mormon Mountains. The discharges from these springs typically are very low (all are less than 1 gpm and most are half that rate) (Walker, 2002).

In addition, several springs of regional importance lie outside of the project area. These springs include: the Littlefield Springs (see *Section 3.3, Surface Water Hydrology*); the Muddy Springs, located in Moapa Valley approximately 20 miles west-southwest of the project area; and the series of springs that rim the Overton Arm of Lake Mead.

Using water-chemistry data, principally deuterium, the general origin of the water that discharges from a given spring can be identified (see CH2M HILL, 2002b, Appendix A). The deuterium data from the springs within both the Tule Desert and the Virgin Valley hydrographic areas indicate that the springs are recharged by local precipitation and that the water likely travels a relatively short distance (on the order of a few miles or less) before discharging.

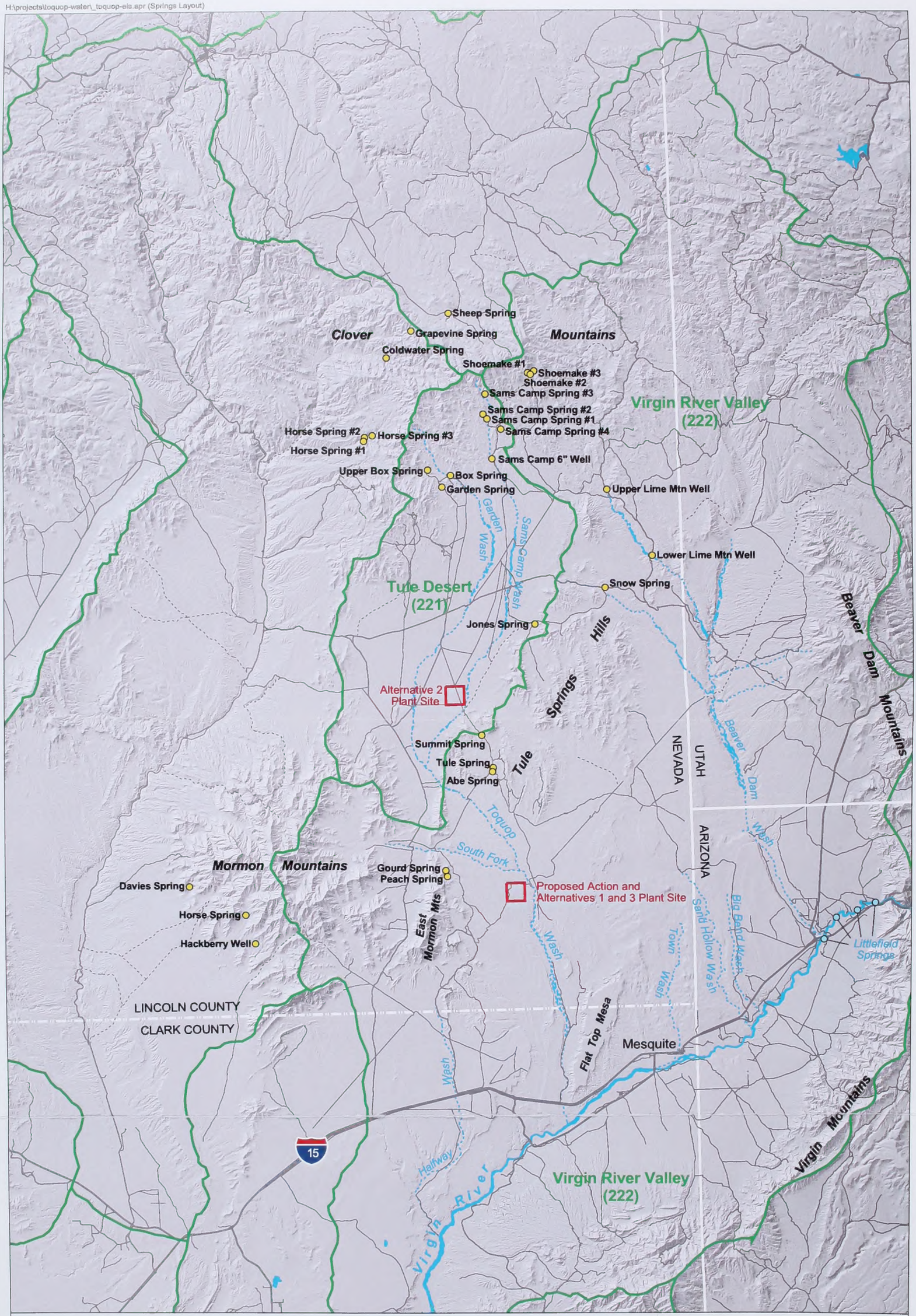
Specifically, higher values of deuterium (lower negative values) represent water that originated as precipitation at relatively lower elevations. The lowest elevation springs (for example, Gourd, Peach, Tule, Summit, Snow, Sam's Camp #4), are in the East Mormon Mountains and Tule Springs Hills, as well as the foothills of the Clover Mountains. These springs all have values of deuterium that range between -76.5 per mil (Peach Spring) and -83 per mil (Tule Spring) with most around -77 per mil.

Springs in the Mormon and Clover Mountains are typically at higher elevations than the Tule Spring Hills (for example, Davies, Horse and Hackberry in the Mormon Mountains; Garden, Box, Upper Box, Sam's Camp #1, #2 and #3, Shoemake #1, #2 and #3, Sheep, and Mud Hole in the Clover Mountains), and have correspondingly lower (higher negative) values of deuterium relative to the springs at lower elevations (that is, the springs are more depleted in deuterium). Specifically, the deuterium values for these Clover and Mormon Mountain springs are all in a narrow band between -86 per mil and -88 per mil.

Both sets of these deuterium values (that is, the values from the lowest elevation springs and the higher elevation Mormon and Clover Mountain springs) contrast with values of deuterium on the order of -100 per mil that correspond to deep, regionally flowing ground water in the carbonate aquifer systems. Accordingly, local recharge is the source for all of the springs that are near the wellfield area (Peach, Gourd, Tule, and Summit springs).

This is consistent with the findings by Prudic et al. (1995), who state that many small springs in the local mountains typically represent perched local systems that are not connected to surrounding and underlying ground water. See CH2M HILL (2002b) for further discussion on the origin of the discharge of the local springs.

The origin of the water that discharges from some of the principal springs outside the project area is regional, but not related to the ground water in the fractured-rock within the Tule Desert. Specifically, the sources of the Littlefield Springs reportedly include both a portion of the



N

0 5 10 Miles

Legend

- Hydrographic Boundary
- Wash or Ephemeral Drainage
- Waterbody
- Spring or Well
- Road
- Trail

Sources: 1:100,000 Vector Linework - BLM Nevada
USGS National Elevation Dataset

Springs in the Vicinity of the Project Area

Map 3-6

CH2MHILL

Virgin River that infiltrates upstream in Utah and emerges downstream at Littlefield, and local recharge from the Beaver Dam Mountains (Trudeau et al., 1983; Cole and Katzer, 2000). In addition, the available water chemistry data from the Littlefield Springs indicates that the spring discharge is chemically unrelated to the ground water in the fractured-rock aquifer within the Tule Desert. Specifically, relative to ground water from PW-1 and MW-4 in the Tule Desert, the Littlefield Springs are less depleted in deuterium, and contain significantly higher concentrations of chloride, sulfate, and total dissolved solids (TDS) relative to the test wells in the Tule Desert (see CH2M HILL, 2002b).

The source of water to the Muddy Springs, 20 miles west-southwest of the project area, is from the regional carbonate-rock aquifer system recharged north of the Clover Mountains, but the discharge of these springs has no relation to the ground water in the Tule Desert. A comparison of the water chemistry of these springs with ground water from PW-1 and MW-4 in the Tule Desert indicates that the Muddy Springs are less depleted in deuterium, and contain considerably higher concentrations of chloride and TDS.

The water that discharges from springs around the Overton Arm of Lake Mead has been found to be of multiple origins, with most of the discharge resulting from local recharge (such as the discharge at Kelsey Spring) (Pohlmann et al., 1998). Rogers Spring, however, appears to have a regional carbonate-aquifer origin, but from sources that are not common with the fractured-rock aquifer of the Tule Desert (Pohlmann et al., 1998). Specifically, relative to ground water from PW-1 and MW-4 in the Tule Desert, the discharge from Rogers Spring is much less depleted in deuterium and is significantly higher in chloride and TDS.

3.4.2.2 Virgin River Valley Hydrogeology

3.4.2.2.1 Ground Water Occurrence.

Much of the Virgin River Valley sits above a deep structural depression in which the underlying bedrock is as much as 6 miles deep below the valley floor (see *Section 3.2, Soils and Geology*). As a result, accessible ground water largely only occurs in the various deposits that comprise the basin-fill material within this hydrographic area.

The basin-fill principally consists of the Muddy Creek Formation, which is typically overlain by a veneer of Older Alluvium where alluvial fans and terraces abut against the local mountains and hills (Glancy and Van Denburgh, 1969; Metcalf, 1995). The Older Alluvium, which consists of the full range of sediments from silt and clay to gravel and boulders, generally thickens toward the center of the valley, and is essentially indistinguishable from the Muddy Creek Formation. Along the floodplain of the Virgin River, the river has cut through the Older Alluvium and deposited sediments commonly referred to as Younger Alluvium (Woessner et al., 1981, Glancy and Van Denburgh, 1969).

3.4.2.2.2 Ground Water Recharge and Flow.

Ground water enters the Virgin River Valley from the north via the regional flow system described above that applies to the Tule Desert, and from areas to the east of the Tule Desert. Ground water also enters the Virgin River Valley from the east including recharge from Beaver Dam Wash and mountain-front recharge from the Beaver Dam and Virgin

mountains (Las Vegas Valley Water District, 1992). In addition, ground water in the Virgin River Valley is also recharged directly by the Virgin River, and locally by residual irrigation water applied to crops in the Virgin River floodplain (see *Section 3.3, Surface Water Hydrology*). Once in the Virgin River Valley, the direction of ground water flow is generally toward the southwest parallel to the Virgin River (Las Vegas Valley Water District, 1992; Dixon and Katzer, 2002).

Conceptually, ground water flow from the Tule Desert into the Virgin River Valley occurs primarily through the fractured-rock aquifer because there is very little direct linkage between saturated portions of the basin-fill materials of each hydrographic area (that is, Toquop Gap, which is much less than 1 mile wide, is the only area where basin-fill sediments of each area merge). Ground water flows from the Tule Desert generally southward in the fractured-rock until the rock is truncated by the north edge of the Virgin River Depression (CH2M HILL, 2002b). At that point ground water discharges into the basin-fill (Muddy Creek and underlying unconsolidated or semi-consolidated formations) of the Virgin River Depression. Once in the basin-fill aquifer system of the Virgin River Valley, ground water flows southwest, parallel to the Virgin River, toward the Overton Arm of Lake Mead (Las Vegas Valley Water District, 1992; Dixon and Katzer, 2002).

The published literature contains a range of estimates of the amount of ground inflow, including ground water recharge, to the Virgin River Valley. These estimates vary based on the assumptions and the data available to the authors. Glancy and Van Denburgh (1969) roughly estimated the combined inflow and recharge to be approximately 6,700 afy. Prudic et al. (1995), using the USGS computer models of ground water flow through the regional carbonate aquifer system, estimated the flow to be approximately 14,000 afy. The computer-derived estimate, however, is based on very general assumptions for conditions. At the time of that analysis, for example, there were no available data from the Tule Desert. Recently, Dixon and Katzer (2002), have performed a comprehensive water-budget analysis on the Virgin River Valley and have concluded that the total recharge to the Virgin River ground water system is on the order of 85,000 afy.

3.4.2.2.3 Aquifer Characteristics. The transmissivity of the Muddy Creek Formation in the Virgin River Valley is reported to be relatively low with values typically less than 10,000 gal/day/ft (Johnson, 2000). Higher transmissivity areas within the Muddy Creek Formation have been discovered where faulting has reportedly facilitated the development of potential localized conduits between the Muddy Creek Formation and the underlying fractured rock (Johnson, 2000).

The total volume of ground water in storage within the uppermost 100 feet of saturated sediments in the Nevada portion of the Virgin River Valley has been reported by Las Vegas Valley Water District (1992) to be approximately 2.9 million acre feet, based on a specific yield of 10 percent.

Dixon and Katzer (2002) estimate that the available perennial yield of the basin-fill aquifer system in the Virgin River Valley is approximately 40,000 afy, after estimates of the current level of pumping (12,000 afy) are included. The perennial yield of a ground water basin is commonly defined as the rate at which water can be

withdrawn perennially without producing an undesirable effect (Todd, 1980).

3.4.2.2.4 Virgin River/Ground Water Interaction. The Virgin River is essentially a "losing" river within the project area (see *Section 3.3.1.3, Surface Water Features*), which means that water from the river infiltrates the subsurface and recharges ground water. This conclusion is based on: 1) observed reductions in river flow in the downstream direction reported by Glancy and Van Denburgh (1969), Woessner (1981), and Metcalf (1995); 2) lower water levels for ground water relative to the elevation of the river, reported in Las Vegas Valley Water District (1992); 3) water-chemistry data indicating that the ground water in the Younger Alluvium immediately adjacent to the river is similar chemically to the Virgin River, but dissimilar to ground water in other basin-fill deposits (Older Alluvium and Muddy Creek Formation) (Metcalf, 1995); and 4) water-chemistry data indicating that the Virgin River downstream of Littlefield is composed exclusively of flows from Beaver Dam Wash, Littlefield Springs, and upstream (Utah) Virgin River flow.

The evidence that the local and regional ground water systems in the Virgin River Valley do not flow into the Virgin River is specifically addressed in CH2M HILL (2002b).

3.4.2.3 Ground Water Quality

3.4.2.3.1 Tule Desert. Based on water samples from the wells in the vicinity of the wellfield, the water quality of the basin-fill deposits appears to be generally very good. This conclusion, however, is based on data from only two wells that are screened exclusively in the basin-fill deposits. The concentration of total dissolved solids (TDS) provides a general indication of water quality. TDS concentrations from MW-5 and the Tule Well are 320 and approximately 200 milligrams per liter (mg/L), respectively, which represents very good quality water. Based on samples from the Tule Well, the general character of the ground water in the basin-fill deposits is calcium-sodium sulfate.

The database on the quality of water in the fractured rock is also quite limited. TDS values from PW-1 and MW-4 are approximately 520 and 500 mg/L, respectively. These data are representative of good quality water, but not quite as good as the ground water in the overlying basin-fill. The general character of the ground water in the fractured rock is sodium sulfate, based on the chemical data from PW-1 (CH2M HILL, 2002a).

In addition to the generally lower values of TDS in the basin-fill ground water relative to the fractured-rock ground water, other differences in the chemistry and water quality between these two aquifers are indicative of the separate nature of these aquifers—despite their tendency to act hydraulically as a single unit in response to pumping. Specifically, when compared with the basin-fill aquifer, the values in the fractured-rock aquifer are: 1) significantly lower with respect to chloride; 2) significantly higher with respect to silica; and 3) significantly lower with respect to deuterium.

3.4.2.3.2 Virgin River Valley. Based on water-quality data described in Glancy and Van Denburgh (1969), Metcalf (1995), and Las Vegas Valley Water District (1992), the general character of the ground water in the floodplain of the Virgin River tends to be mixed cation (sodium,

potassium, magnesium), sulfate type water. Ground water from wells above the floodplain tends to have a composition of predominantly sodium sulfate plus chloride. The concentrations of TDS in wells along the river are very high with values ranging from approximately 2,100 mg/L to over 3,000 mg/L, indicating relatively poor-quality water. The TDS concentrations in wells above the floodplain are generally much lower—on the order of around 400 mg/L to 620 mg/L. Some of these wells above the floodplain, however, have TDS values that approach 2,000 mg/L.

Wells operated by the Virgin Valley Water District that penetrate the Muddy Creek Formation have had problems in the past producing water that meets drinking-water standards, but the water quality tends to improve in the immediate vicinity of faulted areas (Johnson, 2000).

3.4.2.4 Ground Water Use

3.4.2.4.1 Tule Desert. The basin-fill deposits in the Tule Desert are not extensively developed for water supply. Only one well that taps ground water in the basin-fill is known to exist within the Tule Desert. This well, known as the Tule Well (Map 3-5 in CH2M HILL [2002b]), supports seasonal livestock grazing. In addition, some springs in the Tule Desert hydrographic area, particularly in the Clover Mountains, have been tapped to provide stock water (for example, Sam's Camp No. 1, 2, and 3).

Ground water in the fractured-rock aquifer within the Tule Desert has not been developed.

3.4.2.4.2 Virgin River Valley. The basin-fill deposits, principally the Muddy Creek Formation, in the Virgin River Valley have been developed to supply both potable water to the communities of Mesquite and Bunkerville, and to provide water for irrigation along the Virgin River. Currently, the Virgin Valley Water District maintains wells in the Virgin River Valley (Map 3-5) from which approximately 4,000 acre-feet are pumped annually. Within the Arizona portion of the Virgin River Valley, ground water pumping for primarily agricultural use is reported currently to be approximately 8,000 afy (Dixon and Katzer, 2002). The current total ground water withdrawal from the Virgin River Valley hydrographic area is therefore approximately 12,000 afy.

In addition, springs along the eastern flanks of the East Mormon Mountains and Tule Springs Hills have been tapped to provide stock water (Tule, Gourd, and Snow Water springs).

Because of the tremendous depths to the underlying carbonate rocks within the Virgin River Valley, this source of ground water has not been developed.

3.4.3 Pah Rah Parcel

Ground water has not been developed or studied at the Pah Rah parcel. As a result, while ground water is undoubtedly present within the fractured volcanic rocks that underlie the parcel, the specific nature of the ground water resources are unknown. No wells or springs are present on the parcel.

3.5 Biological Resources

3.5.1 Threatened, Endangered, Candidate, and Sensitive Species

3.5.1.1 Toquop Area

The U.S. Fish and Wildlife Service (FWS) provided a list that identified federal- and state-listed plant and wildlife species that are protected, sensitive, or species of concern potentially occurring in the project area. *Appendix D* contains official correspondence from the FWS identifying listed species, candidate species, and species of concern that may occur within the vicinity of the proposed Toquop Energy Project. One federally listed species was identified as occurring in the project area: the threatened desert tortoise (*Gopherus agassizzi*). Federally protected species associated with the Virgin River that were identified by the FWS were considered in assessing the potential for impact by the project as a result of ground water pumping. Those species are the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), Yuma clapper rail (*Rallus longirostris yumanensis*), woundfin (*Plagopterus argentissimus*), Virgin River chub (*Gila seminuda*), and the candidate yellow-billed cuckoo, Western Distinct Population Segment (*Coccyzus americanus*).

3.5.1.1.1 Desert Tortoise. The project area is located within desert tortoise habitat. The area south and east of this area is the Mormon Mesa Area of Critical Environmental Concern (ACEC) for desert tortoise habitat (BLM, 2000). The southern plant site is also adjacent to two FWS-designated desert tortoise critical habitat units: Mormon Mesa Unit to the south and the Beaver Dam Slope Unit to the east (FWS, 1994). Maps 3-7, 3-8, and 3-9 show desert tortoise habitat and critical habitat in relation to features of the Proposed Action and Alternative 3, Alternative 1, and Alternative 2, respectively.

Activity patterns of the desert tortoise are closely related to ambient temperatures and forage availability. Desert tortoises spend much of their lives in burrows, emerging to feed and mate during late winter and early spring. They remain active through the spring and portions of the summer through late fall. Their active season is typically defined as being from March 1 through October 31.

Existing threats to this species include direct and indirect human-caused mortality. Impacts such as destruction, degradation, and fragmentation of their habitat from urbanization, agricultural development, livestock grazing, mining, roads, vehicle-oriented recreational use, and losses from human take and disease have contributed to population declines (FWS, 1994).

Based on past surveys in the project area using the strip transect method, the project area supports a low-density desert tortoise population. Strip transects walked by Karl (1980) in and adjacent to the project area indicated tortoise population densities were very low (less than 10 tortoises per square mile). Strip transects walked in 1990 in the current right-of-way of the Kern River Gas Pipeline also recorded low sign counts with corresponding estimates of low densities of tortoises in the Toquop Wash area of the proposed project. Estimated densities were in the low range (10 to 45 tortoises per square mile) between mileposts 420 and 423 and in the very low range (zero to 10 tortoises per square mile)

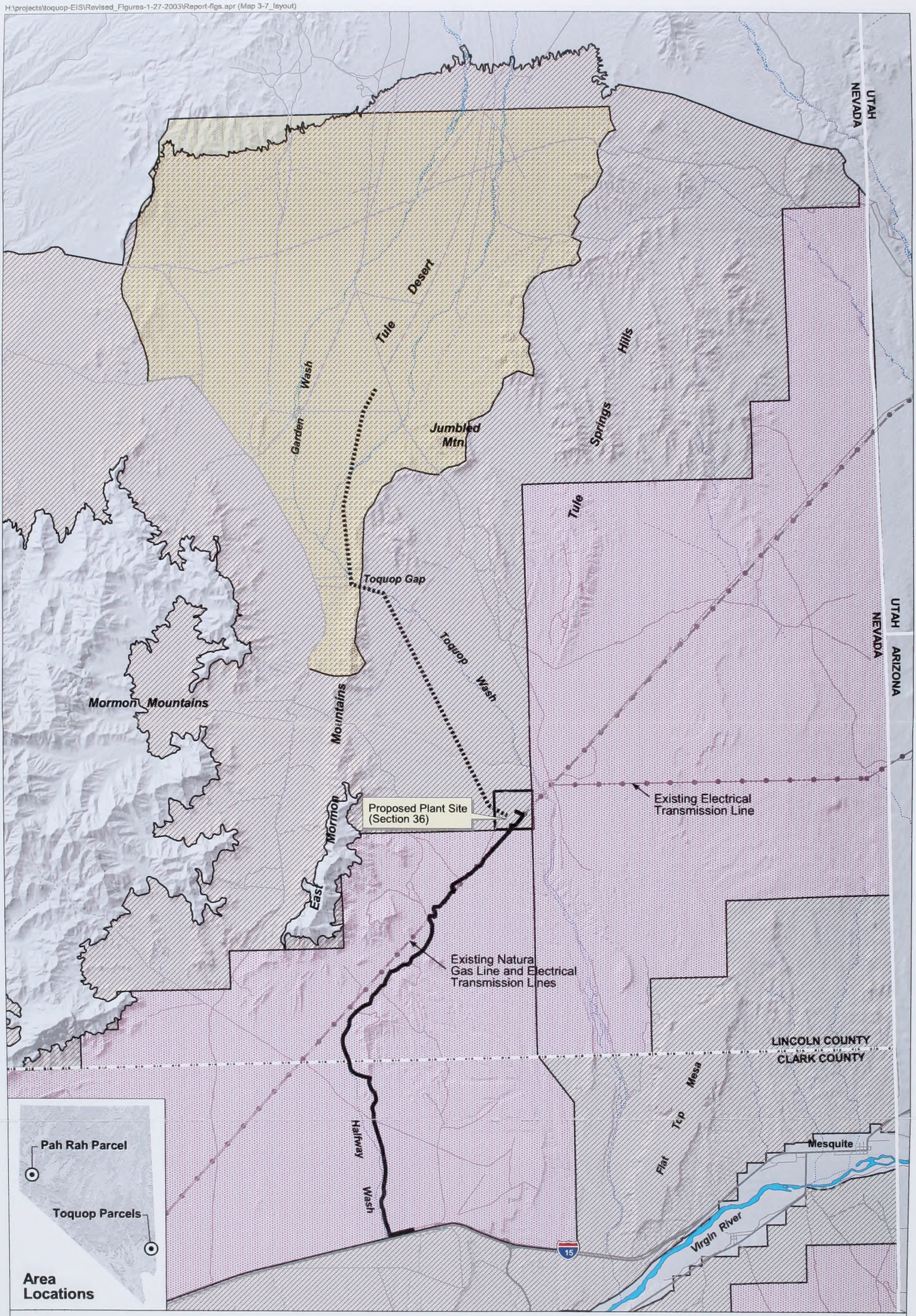
between mileposts 423 and 424 (Dames & Moore, 1990a). The proposed power plant site is adjacent to the Kern River Gas Pipeline at approximately MP 422. Milepost numbers increase from east to west on the pipeline route.

The Sand Hollow permanent study plot is located approximately 5 to 6 miles east of the project area. Two samples of this study plot indicated a low density of desert tortoise. The plot was sampled in 1989 and again in 1994 with estimates of 8 and 15 tortoises per square mile, respectively (National Biological Service, 1995). Based on all data collection efforts in the project area, a reasonable estimate of desert tortoise density is approximately 11 tortoises per square mile. Project features and rights-of-way associated with the Proposed Action and Alternative 1 would be located on approximately 449 acres and 451 acres of desert tortoise habitat, respectively. Alternative 2 features and rights-of-way would be located on approximately 581 acres of desert tortoise habitat. Alternative 3 features and rights-of-way would be located on approximately 417 acres of desert tortoise habitat.

3.5.1.1.2 Southwestern Willow Flycatcher. The southwestern willow flycatcher is a federally listed endangered species. It is a small bird with a grayish-green back and wings, whitish throat, light grey-olive breast, and pale yellowish belly. The breeding range of the southwestern willow flycatcher includes Arizona, southern California, New Mexico, the extreme southern parts of Utah and Nevada, southwestern Texas, and extreme northwestern Mexico. The habitat of this species includes riparian habitats along rivers, streams, or other wetlands with a dense growth of willows (*Salicaceae*), arrowweed (*Pluchea sevicea*), and tamarisk (*Tamaricaceae*), often with a scattered overstory of cottonwood (*Salicaceae populus*) (FWS, 1995). Breeding usually occurs in swampy thickets with willow and buttonbrush (American Ornithologists Union, 1983). During migration, southwestern willow flycatchers use a variety of habitats and may be encountered in all but the most sparse, desert habitats. These habitats do not exist on any of the project feature sites.

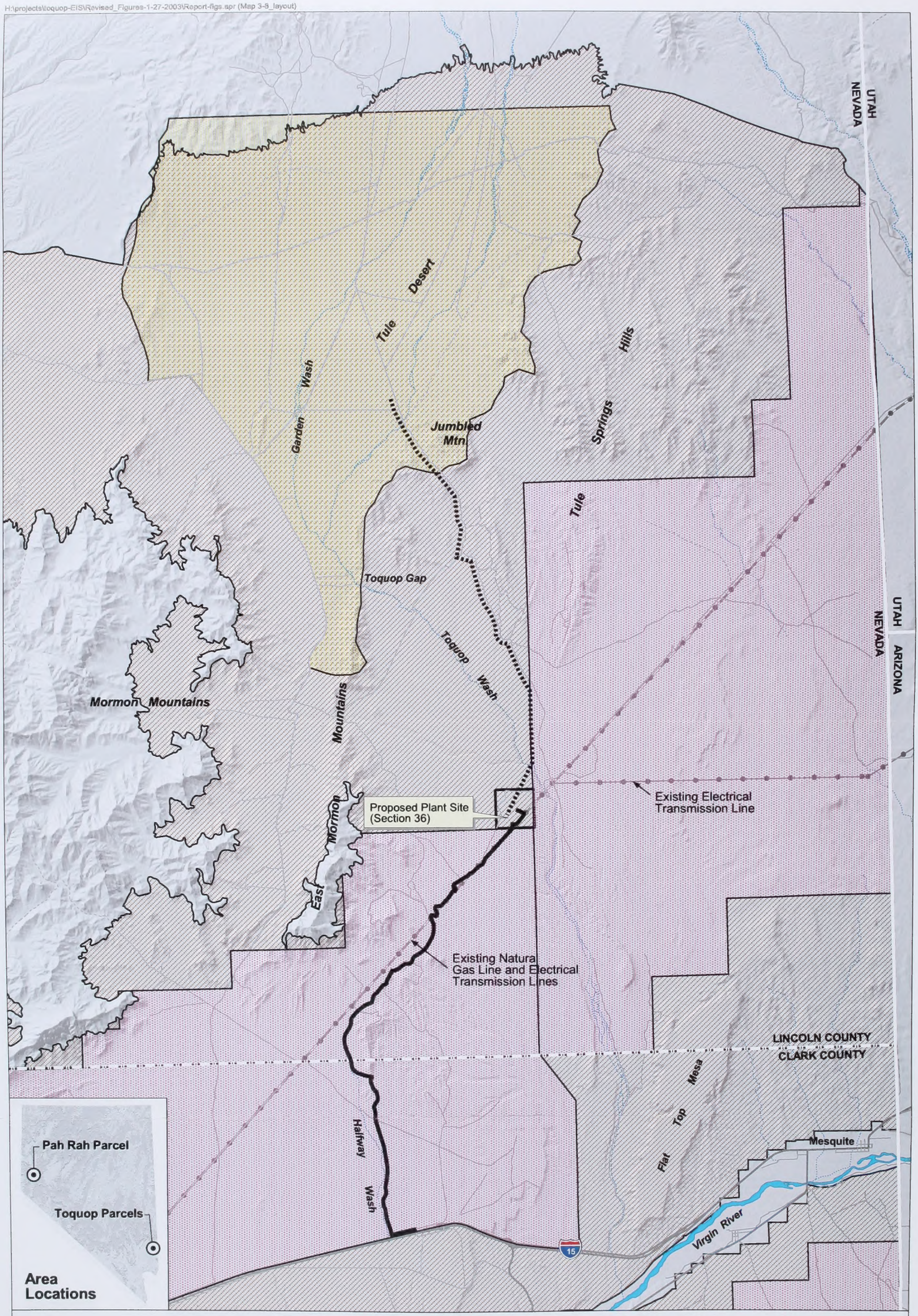
3.5.1.1.3 Yuma Clapper Rail. The Yuma clapper rail is a federally listed endangered species. Its preferred habitat is sedimented, shallow water cattail (*Typha latifolia*) and bulrush (*Scirpus acutus*) marshes. The Yuma clapper rail nests primarily in freshwater marshes in mature cattail-bulrush habitat. Nests are commonly found at or near the water's edge. Stands of cattail and bulrush dissected by narrow stream channels apparently support the densest populations of Yuma clapper rails. The closest potential habitat is on the Virgin River.

3.5.1.1.4 Woundfin. The historical range of the woundfin, an endangered fish species, included the Salt, Verde, and Gila rivers in Arizona; the lower Colorado River; and the Virgin River in Utah and Nevada. This species has been extirpated from most of its historical range except for the Virgin River. Presently, the woundfin's range in the Virgin River extends from La Verkin Springs in Utah downstream to Lake Mead (Virgin River Fishes Recovery Team, 1985). Woundfin also occur in the lower portions of La Verkin Creek in Utah, which is a tributary to the Virgin River. Critical habitat has been designated for this species in the Virgin River and its 100-year floodplain from its confluence with La Verkin Creek



Toquop Energy Project
Tortoise Habitat Areas
Proposed Action and Alternative 3
(Proposed Action - Water Cooled
Alternative 3 - Air Cooled
All other features are the same)
Map 3-7

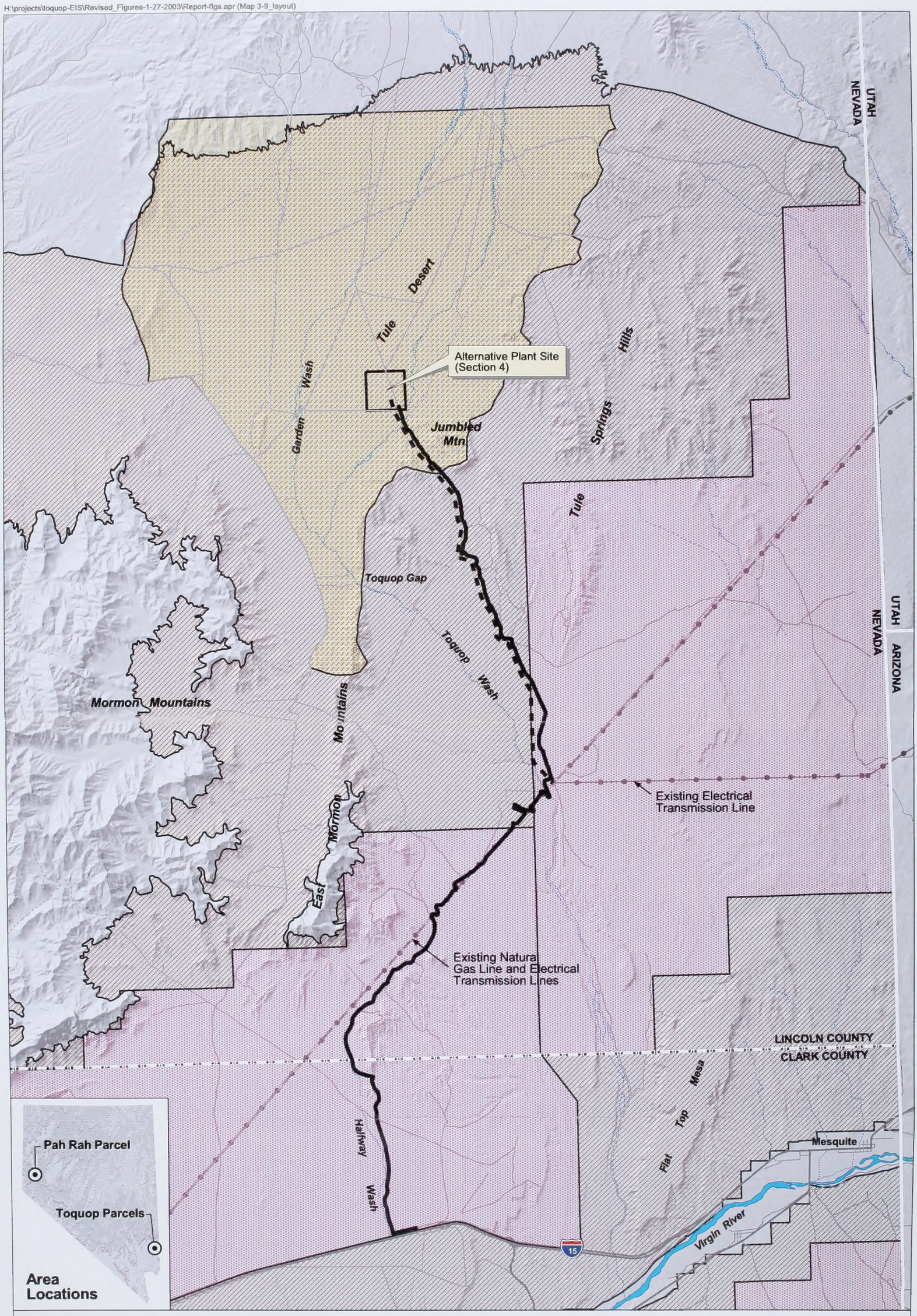
CH2MHILL



Toquop Energy Project
Tortoise Habitat Areas
Alternative 1

Map 3-8

CH2MHILL



Toquop Energy Project
Tortoise Habitat Areas
Alternative 2

Map 3-9

CH2MHILL

in Utah downstream to Halfway Wash in Nevada.

3.5.1.1.5 Virgin River Chub. The Virgin River chub, an endangered fish species, historically occurred in the mainstem Virgin River from La Verken Springs, Utah, downstream to the confluence with the Colorado River in Nevada (Virgin River Fishes Recovery Team, 1985). The present distribution of this fish species includes the mainstem Virgin River from La Verkin Springs, Utah, downstream to near the Mesquite Diversion, Nevada. Another distinct population, which is isolated by Lake Mead, occurs in the middle and upper portions of the Muddy River in Nevada. Critical habitat has been designated for this species in the Virgin River and its 100-year floodplain from the confluence with La Verkin Creek in Utah downstream to Halfway Wash in Nevada. This critical habitat designation is the same area as designated for the woundfin.

3.5.1.1.6 Candidate Species, Yellow-Billed Cuckoo. Yellow-billed cuckoo is a candidate for listing as threatened or endangered west of the Rocky Mountains. While this species is relatively common east of the Rocky Mountains, there is concern for loss or degradation of the species' riparian habitat in the West. Its breeding range formerly included most of North America from southern Canada to Mexico. Western yellow-billed cuckoos breed in large blocks of riparian habitats, particularly woodlands with cottonwoods and willows. Dense understory foliage appears to be an important habitat feature. The closest occupied habitat to the project area is the Virgin River (FWS, 2001).

3.5.1.1.7 Species of Concern and Other Sensitive Species. Table 3-3 lists species of concern identified during consultation with the FWS (2001) (see *Appendix D*) as potentially occurring within the vicinity of the project area. Banded Gila monsters (*Heloderma suspectum cinctum*) are protected from collection and killing under Nevada law (Nevada Revised Statute [NRS] 501.110). This species is more common in mountainous areas; however they could occur virtually anywhere in the project area.

TABLE 3-3
Species of Concern that may Occur Within the Vicinity of the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada

Common Name	Scientific Name
Birds	
Western burrowing owl	*Athene cunicularia hypugea*
Black tern	*Chlidonias niger*
Blue grosbeak	*Guiraca caerulea*
American peregrine falcon	*Falco peregrinus anatum*
Least bittern	*Ixobrychus exilis hesperis*
Phainopepla	*Phainopepla nitens*
Summer tanager	*Piranga rubra*
White-faced ibis	*Plegadis chihi*

TABLE 3-3
Species of Concern that may Occur Within the Vicinity of the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada

Common Name	Scientific Name
Vermilion flycatcher	*Pyrocephalus rubinus*
Lucy's warbler	*Vermivora luciae*
Arizona Bell's vireo	*Vireo bellii arizonae*
Fish	
Virgin spinedace	*Lepidomeda mollispinis mollispinis*
Mammals	
Spotted bat	*Euderma maculatum*
Greater western mastiff bat	*Eumops perotis californicus*
Allen's big-eared bat	*Idionycteris phyllotis*
California leaf-nosed bat	*Macrotus californicus*
Small-footed myotis	*Myotis ciliolabrum*
Long-eared myotis	*Myotis evotis*
Fringed myotis	*Myotis thysanodes*
Long-legged myotis	*Myotis volans*
Yuma myotis	*Myotis yumanensis*
Big free-tailed bat	*Nyctinomops macrotis*
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*
Amphibians	
Arizona southwestern toad	*Bufo microscaphus microscaphus*
Relict leopard frog	*Rana onca*
Reptiles	
Banded Gila monster	*Heloderma suspectum cinctum*
Chuckwalla	*Sauromalus obesus*
Plants	
Threecorner milkvetch	*Astragalus geyeri* var. *triquetrus*
Sticky buckwheat	*Eriogonum viscidulum*
Beaver Dam scurfpea	*Pediomelum castoreum*

*Species list provided by FWS (2001) (see *Appendix D*).

Although not formally protected by federal law, the chuckwalla (*Sauromalus obesus*) is considered rare and protected by the Nevada Department of Wildlife (NDOW) and as a special status (sensitive) species by the BLM. Chuckwalla habitat in the project area is rocky outcrops (including exposed caliche strata) and/or heavily bouldered terrain.

Like the woundfin and Virgin River chub, the Virgin spinedace (*Lepidomeda mollispinis mollispinis*)—another fish species—is dependent on aquatic habitats of the Virgin River.

With the exception of domestic pigeons (*Columbina passerina*), house sparrows (*Passer domesticus*), and European starlings (*Sturnus vulgaris*), all birds in the project vicinity are protected under the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 United States Code [U.S.C.] 703-712). Suitable habitat for the burrowing owl (*Athene cunicularia hypugea*) occurs throughout the project area. Because burrowing owls are year-round residents in the area, the potential for impact is high. Burrowing owls are often found in the same habitat as desert tortoises because they utilize abandoned desert tortoise burrows. The burrowing owl is protected under the MBTA, which states that it is unlawful to take, kill, or possess migratory birds (16 U.S.C. 703-711). Potential for impacts on migratory birds is primarily a concern during the breeding season, which occurs during the spring and summer for burrowing owls. Other bird species of concern listed in Table 3-3, as well as the yellow-billed cuckoo *(Coccyzus americanus)* which is a FWS candidate species, are found in the region and have the potential to pass through the project area as migrants or occasional visitors.

Many types of bats that could potentially occur in the project area are also considered species of concern by the FWS. These bat species are identified in Table 3-3. All but four of the bat species listed in Table 3-3 are considered sensitive species by the BLM. The four that are not listed are the greater western mastiff bat, fringed myotis, long-legged myotis, and Yuma myotis (BLM, 1999). Although such habitats are unusual, certain naturally occurring caves and even some abandoned mines, can provide the necessary temperature regimes for bats. The continued presence of such features is critical to maintaining some local bat populations; however, no specific sites like these have been identified at project feature sites.

Three plant species of concern listed in Table 3-3 were identified for field surveys as a result of a species list requested from the FWS. Subsequently, information regarding these species' habitats and blooming times was reviewed as a part of these biological studies. Field surveys were conducted at the southern Toquop power plant site on April 17, 2001, for beaver dam scurfpea (*Pediomelum castoreum*) and threecorner milkvetch (*Astragalus geyeri* var. *triquetrus*), and on May 16, 2001, for sticky buckwheat (*Eriogonum viscidulum*). This second survey was necessary because sticky buckwheat flowers approximately 3 to 4 weeks later than the milkvetch species. The surveys conducted were timely for the species occurrence and extensive.

Resource Concepts, Inc., presented their survey methods, species review, study results, conclusions reached, and copies of correspondence from the Nevada Department of Conservation and Natural Resources, Nevada Natural Heritage Program, in a report titled "Cogentrix Project, Plant Species of Concern, Survey Results" (Resource Concepts Inc., 2001a). The Resource Concepts study conclusion is presented in the text below.

The dominant parent material throughout the entire survey area—older (Tertiary) lacustrine deposits overlying carbonate rock—seems to not weather into a coarse enough soil (sand) to support the

necessary habitat for the species of concern in this area. Where soils were dominated by limestone bedrock the weathering actions seemed again to create soil that was fine-grained and shallow, with no associated sand dunes or dune edges. The numerous washes in the area, particularly the Toquop Wash, did have sandy sites normally just above the active scoured channel. Sand-adapted species, especially the Nye milkvetch, were quite common in these areas, though none of the endangered species were found. Large expanses of habitat not associated with these species between the washes could greatly reduce seed sources that could take advantage of the available habitat associated with the washes. The surveys conducted were timely for the species occurrence and extensive. The area did not contain the target plants: *Astragalus, Erigonum, or Pediomelum.*

3.5.1.2 Pah Rah Parcel

The Pah Rah parcel has not been identified or proposed as significant or critical habitat for any wildlife species. Field reviews of the area for wildlife were conducted in April, May, and November 2001. During the field reviews, sage grouse (*Centrocercus urophasianus*) sign was common with possible lek areas observed in the central portion of the parcel. In addition, two sage grouse—a species of concern—were observed during the November field review.

Five BLM-sensitive plant species were identified for field surveys. The species are altered andesite buckwheat (*Eriogonum robustum*), Lemmon buckwheat (*Eriogonum lemmonii*), Webber ivesia (*Ivesia webberi*), Nevada oryctes (*Oryctes nevadensis*), and Nevada suncup (*Camissonia nevadensis*). Field reconnaissance on the Pah Rah parcel was conducted on May 15, 2001, and none of these plant species were identified.

3.5.2 Native Vegetation, Invasive Species, and Noxious Weeds

3.5.2.1 Toquop Area

The Toquop area lies within the Mojave Desert biome. Vegetation communities within this biome and represented at the Toquop area can be further characterized as southern desert shrub and northern desert shrub. The topography is characterized by high mountain ranges with intervening valleys and canyons featuring broad alluvial fans and bajadas. Climate of the Mojave Desert is typified by hot dry summers and cool dry winters with annual precipitation ranging between 4 and 12 inches. Southern desert shrubs generally occur between 1500 and 5000 feet in elevation. The vegetation in the Toquop area is representative of a more mesic portion of the Mojave Desert based upon the dominance/presence of black brush (*Coleogyne ramosissima*) on most sites and elevations mostly above 2100 feet.

Plants representative of the southern desert shrub community include creosote (*Larrea tridentata*), shadscale (*Atriplex confertifolia*), white bursage (*Ambrosia dumosa*), Joshua tree (*Yucca brevifolia*), Mojave yucca (*Yucca schidigera*), and Mormon tea (*Ephedra nevadensis*). Associated species include range ratany (*Krameria parvifolia*), desert trumpet (*Eriogonum inflatum*), big galleta (*Hilaria rigida*), Indian ricegrass (*Oryzopsis hymenoides*), and spiny hopsage (*Grayia spinosa*). The northern desert shrub plant community is characterized by black brush, creosote, yuccas, bursage, rabbit brush (*Chrysothamnus* spp.), snake weed

(*Gutierrezia* spp.), big galleta, Indian ricegrass, and sand dropseed (*Sporobolus cryptandus*). Cactus species such as beavertail (*Opuntia basilaris*), staghorn cholla (*Opuntia acanthocarpa*), hedgehog (*Echinocereus engelmannii*), and barrel cactus (*Ferocactus wislizenii*) are present throughout the project site. The following species are common in all portions of the Toquop area: Joshua trees (*Yucca brevifolia*), creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), Nevada ephedra, turpentine broom (*Rutaceae Thomnosina*), white burrobush (*Ambrosia dumosa*), filaree (*Erodium cicutarium*), desert trumpet (*Eriogonum inflatum*), annual phacelia (*Phacelia*), fiddleneck (*Amsinckia*), and red brome (*Bromus*). Exceptions are the gypsiferous soils located just north of the Toquop Wash and the active wash channels that support distinctive vegetation. Additional species found in the wash include desert willow (*Bignoniaceae chiliopsis*), western mugwort (*Artemisia ludoviciana*), desert poppy (*Papaveraceae Arctomecon*), sweet clover (*Crossosomataceae melilotus*), robust fourwing saltbush (*Atriplex canescens*), rabbit brush (*Chrysothamnus* spp.), Mojave aster (*Machaeranthea tortifolia*), and desert needlegrass (*Stipa speciosa*). Salt cedar (*Tamarix ramosissima*), a noxious weed, is present in the Toquop Gap. The entire project area supports various cacti species, yuccas, and Joshua trees. All species in the cactus family (Cactaceae) and members of the genus *Yucca* and *Agave* are protected by Nevada State Law (NRS 527.060-.120).

All drainages along the roads were observed to support rabbit brush, fourwinged saltbrush, and an annual lupine (*Lupinus*). These species were unique to the drainages. The introduced winter annual filaree (*Erodium cicutarium*) dominated the interspaces between shrub species on all the sites surveyed with the exception of the washes. The washes contained annual lupine, popcorn flower (*Plagiobothrys* spp.), small flowered blazing star (*Mentzelia minutiflora*), and bladder sage (*Labiatae salazaria*). Indian paintbrush (*Castilleja chromosa*) grew under protective shrubs along with isolated occurrences of desert larkspur (*Loasaceae mentzelia*).
Within the project area four genera of invasive, non-native plant species have been observed. The most common are annual grasses in the genus *Shismus,* commonly known as Mediterranean grass, and *Bromus*. In some areas these two genera have been reported to account for up to 100 percent of the ground cover. Prevalence of these grasses is greatly dependent on rainfall and temperature. Both thrive on disturbed soils. In some areas Russian thistle (*Salsola iberica)* and tamarisk (*Tamarix ramosissima*) are common. Tamarisk is on the Ely District Weed List; and red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), and Russian thistle have been identified as injurious plants within the Ely District (BLM, 1999; FERC and CSLC, 2002). Thirteen species of noxious weeds on the Nevada State Weed List have been identified as occurring in the Ely District (BLM 1999). However, none of these species were observed in the Project Area during field surveys and they have not been reported as occurring in the area in any documents reviewed for the project. All these invasive, non-native plants, except Mediterranean grass, are considered noxious weeds by the BLM (1999).

3.5.2.2 Pah Rah Parcel

The Pah Rah parcel supports a fairly monotypic vegetation community

represented by a few annual and perennial plants described below. The Pah Rah parcel is undisturbed habitat containing no roads and is accessible only by foot. The parcel is typical of other relatively undisturbed habitats at similar elevations in the surrounding area.

Vegetation within the subject property is typical of the Great Basin Desert. Shrub vegetation is fairly uniform throughout the area. Shrubs include bud sage (*Artemisia spinescens*), spiny hop sage (*Grayia spinosa*), big sage (*Artemisia tridentata*), fourwinged saltbrush (*Atriplex canescens*), and green rabbit brush (*Chrysothamnus* spp.). Flowering plants identified during surveys include phlox (*Plemoniaceae Phlox*), Indian paintbrush, and bitterroot (*Lewisia rediviva*). Lichens are abundant on rocky surfaces. Temperatures typically vary from approximately 40°F in winter to 100°F in summer. Average annual precipitation (in Washoe County) varies from approximately 4 to 16 inches. The majority of the section is relatively flat. The highest elevation is 6253 feet (along the western boundary), and the lowest elevation is 5299 feet.

Noxious weeds were not noted during the field reconnaissance in May. There are no records indicating the presence of noxious weeds on the parcel. Because of the remote nature of the parcel and the lack of roads, it is unlikely that noxious weeds are present.

3.5.3 Wild Horses and Burros

On December 15, 1971, Congress enacted the Wild and Free-Roaming Horse and Burro Act, authorizing the BLM to manage wild horses and burros on the public lands and mandating that wild and free-roaming horses and burros be protected from unauthorized capture, branding, harassment, or death. Those areas of public land that were used as habitat for wild horses and burros in 1971 were delineated as Herd Management Areas (HMA). The BLM's policy is to protect, manage, and control wild horses and burros on public lands.

3.5.3.1 Toquop Area

The proposed south Toquop parcel (plant site) is not within an identified HMA; however, the proposed wellfield/pipeline and adjacent north Toquop parcel (plant site) are located within two HMAs. The proposed wellfield enters the northeast portion of the Mormon Mountain HMA, which has an Appropriate Management Level (AML) set at zero for wild horses. The northern portion of the wellfield lies within the Blue Nose Peak HMA. The AML for the Blue Nose Peak HMA is currently being set through the Multiple Use Decision process. No wild horses or burros were observed during field surveys. Wild horses use the northern portion of the wellfield at various times of the year to utilize existing livestock water improvements.

3.5.3.2 Pah Rah Parcel

The Pah Rah parcel is located in a Herd Area for wild horses and burrows and is managed by BLM as a "horse free" area because these animals are not compatible with the increased development in the area. No wild horses or burros were observed during the spring field reconnaissance surveys.

3.5.4 Wildlife and Fisheries Resources

3.5.4.1 Toquop Area

The parcel supports a diversity of wildlife species common to the desert habitats. Numerous previously identified reptile, rodent, bird, and small mammal species inhabit or utilize this parcel. The desert tortoise, a federally listed species, is known to occupy this parcel. The parcel does not support a dense population of desert tortoise.

A wide variety of terrestrial species presently occupies and/or otherwise uses the project area. Fish are absent from the project area because of the lack of suitable aquatic environments.

3.5.4.1.1 Amphibians. Amphibian species potentially occurring within the area include the Great Basin spadefoot (*Scaphiopus intermountonus*), western toad (*Bufo boreas*), red-spotted toad (*Bufo punctatus*), Great Plains toad (*Bufo cognatus*), and the leopard frog (*Rana pipiens*). These highly desert-adapted species occur throughout the Mojave Desert region. The somewhat less-desert-adapted Woodhouse's toad (*Bufo woodhousei*) might also be expected within moist areas.

3.5.4.1.2 Reptiles. A wide variety of reptile species occupies the project area. Southern Nevada deserts support at least 16 lizard species, many of which occupy the Toquop area. These include side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), zebra-tailed brush lizard (*Urasourus graciosus*), desert horned lizard (*Phrynosoma platyrhinos*), desert iguana (*Dipsosaurus dorsalis*), chuckwalla (*Sauromalus obesus*), long-nosed leopard lizard (*Gambelia wislizenii*), desert collared lizard (*Crotaphytus insularis*), banded gecko (*Coleonyx variegatus*), and Gila monster.

Eighteen snake species occur locally and, as with the lizards, several can be found in the project area. These include western blind snake (*Leptotyphlops humilis*), ground snake (*Sonora semiannulata*), spotted leaf-nose snake (*Phyllorhynchus decurtatus*), red racer (*Masticophis flagellum*), patch-nosed snake (*Salvadora hexalepis*), gopher snake (*Pituophis melanoleucus*), glossy snake (*Arizona elegans*), long-nosed snake (*Rhinocheilus lecontei*), king snake (*Lampropeltis getulus*), night snake (*Hypsiglena torquata*), lyre snake (*Trimorphodon biscutatus*), sidewinder or horned rattlesnake (*Crotalus cerastes*), Mojave rattlesnake (*C. scutulatus*), and speckled rattlesnake (*C. mitchellii*).

3.5.4.1.3 Migratory Birds. A wide variety of avian species either occupies or migrates through the Toquop area. Some typical nesting species of local, open desert environments are the black-throated sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), horned lark (*Eremophila alpestris*), greater road runner (*Geococcyx californianus*), ash-throated flycatcher (*Myiarchus cinerascens*), Say's phoebe (*Sayornis saya*), verdin (*Auriparus flaviceps*), loggerhead shrike (*lanius ludovicianus*), mourning dove (*Zenaida macroura*), and Gambel's quail (*Callipepla gambelii*).

In the more rugged upland and canyon locales, rock wren (*Salpinctes obsoletus*), raven (*Corvus corax*), barn owl (*Tyto alba*), great-horned owl (*Bubo virginianus*), prairie falcon (*Faleo mexicanus*), American kestrel (*Faleo*

sparverius), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), and turkey vulture (*Cathartes aura*) can also be considered as likely locally nesting species.

Virtually all migrant species using western flyways potentially pass through this area during their spring and fall migrations.

Gambel's quail habitat occurs throughout the entire project area. Higher concentrations of quail can be expected around the major washes, cattle stock tanks, and springs that occur on the proposed project plant and well sites, access roads, and utility corridors. Numerous coveys of quail were observed during surveys of the Toquop area.

3.5.4.1.4 Mammals. Several carnivores occupy the various habitats that occur throughout or near the project area. Bobcat (*Lynx rufus*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), gray fox (*Urocyon cinereoargentus*), and badger (*Taxidea taxus*) might reasonably be encountered in suitable habitats along the various utility corridors. Mountain lion (*Felis concolor*) is a possible occupant of the Mormon Mountain uplands.

Various other mammals also inhabit the project area. Typical species include black-tailed jackrabbit (*Lepus californicus*), desert cottontail rabbit (*Sylvilagus audobonii*), desert wood rat (*Neotoma lepida*), white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), round-tailed ground squirrel (*Citellus tereticaudus*), pocket gopher (*Thomomys bottae*), kangaroo rat (*Dipodomys* sp.), various cricetid mice (*Onychomys* sp., *Reithrodontomys megalotis, Peromyscus* sp.), and pocket mice (*Perognathus* sp.). Bighorn sheep (*Ovis canadensis nelsoni*) and mule deer (*Odocoileu hemionus*) are managed by NDOW (NRS 501) and occupy mountainous areas through which the various alignments pass along the East Mormon Mountains.

3.5.4.2 Pah Rah Parcel

The monotypic vegetation community which characterizes the parcel (see *Section 3.5.2.2, Pah Rah Parcel*) contains a diversity of wildlife species. Numerous reptile, bird, rodent, and other small mammals previously described inhabit or use this parcel. Large mammals such as pronghorn antelope have been frequently observed on the parcel. Mule deer are likely infrequent visitors. Use of this parcel by sage grouse, a Nevada-listed and BLM sensitive species, is an additional wildlife value.

3.5.4.2.1 Amphibians. The Great Basin spadefoot and western toad may occupy the Pah Rah parcel.

3.5.4.2.2 Reptiles. Several species of reptiles are known or expected to occur on the subject parcel. Lizard species include the zebra-tailed, leopard, collared, desert spiny (*Sceloperus magister*), western fence sagebrush (*Sceloporus graciosus*), side-blotched, northern desert horned (*Phrynosoma platyrhiros*), western skink (*Eumeces kiltonianus*), and western whiptail (*Cnemidophorus tigris*). Snake species potentially occurring at the site include the rubber boa (*Charina bottae*), red racer, striped whipsnake (*Masticophus taeniatus*), western patch-nosed, gopher, California kingsnake, long-nosed snake, western garter snake (*Thamnophis elegans*), western ground snake, night snake, and the Great Basin rattlesnake (*Crotalus lutesus*).

3.5.4.2.3 Migratory Birds. A wide variety of bird species either occupies or migrates through the project area. Typical nesting species likely to use the site include: chukar (*Alectoris* sp.), morning dove, burrowing owl, western flycatcher (*Empidonax difficilis*), green-tailed towhee (*Pipilo chloruros*), house finch (*Carpodacus mexicanus*), western kingbird (*Tyrannus vociferans*), horned lark, rock wren, canyon wren (*Catherpes mexicanus*), sage thrasher (*Oreoscoptes montanus*), sage sparrow (*Amphispiza belli*), and black-throated sparrow.

3.5.4.2.4 Mammals. Several carnivores are expected to occupy or use the Pah Rah parcel. Bobcat, coyote, kit fox, and badger are likely to be present on this parcel. Mountain lions may occasionally utilize this area during hunting forays. Other common species present, or likely to be present, at this site include black-tailed jackrabbit, yellowbelly marmot (*Marmota flaviventris*), Townsend ground squirrel (*Citellus townsendi*), least chipmunk (*Eutamius minimus*), white-tailed antelope ground squirrel, northern pocket gopher, pocket mice, various cricetid mice, mountain cottontail (*Sylvilagus nuttalli*), mule deer, and pronghorn antelope.

3.5.5 Wetlands/Riparian Zones, Floodplains, and Waters of the United States

The identification of wetlands, rivers, and streams within the project area was based on review of the 1:24,000-scale U.S. Geological Survey (USGS) topographic maps and several field reconnaissance surveys conducted at the Toquop sites in November 2001. National Wetland Inventory (NWI) maps, which are prepared by the FWS, have not been prepared for the proposed sites. The identification of floodplains is based on the Federal Emergency Management Agency (FEMA) floodplain maps.

Areas inspected for the presence of ephemeral washes or other potential waters of the United States (such as wetlands or aquatic areas) included the proposed plant sites, well sites, access roads, and western and eastern pipeline/utility alignments. The delineation of areas potentially within U.S. Army Corps of Engineers (USACE) jurisdiction included those areas within the ordinary high water mark (OHWM). The proposed jurisdictional limits were delineated at the OHWM as identified by sediment lines, debris marks, or natural banks. The locations of the potential waters of the United States were recorded by a global positioning system (GPS) unit and marked on topographic maps of the project area.

3.5.5.1 Toquop Area

Numerous ephemeral washes convey runoff from the surrounding hillsides. The primary named ephemeral washes within the Toquop area are Halfway Wash, near I-15, between the Mormon Mountains and East Mormon Mountains; Toquop Wash and South Fork Toquop Wash, east of the East Mormon Mountains; Sam's Camp Wash, north and west of the Tule Springs Hills; and Garden Wash. Many of these ephemeral washes are classified as waters of the United States and are subject to the requirements of Section 404 of the Clean Water Act (CWA).

Wetlands or other aquatic areas are found near springs in the Toquop area and along the Virgin River. These are shown on Map 3-6, in *Section 3.4, Ground Water Resources*.

According to the FEMA floodplain map (Map Index Community Panel Number 320014 0001-5525), the Toquop area is located in Zone D. Zone D is defined on the FEMA map as "areas of undetermined, but possible, flood hazards."

3.5.5.2 Pah Rah Parcel

Perennial water bodies and waters of the United States are not present within the Pah Rah parcel. No wetlands, other aquatic areas, or riparian vegetation are present within the Pah Rah parcel.

3.6 Air Quality and Noise

3.6.1 Air Quality

3.6.1.1 Toquop Area

3.6.1.1.1 Climate and Meteorology.

The locations of the Proposed Action and Alternatives 1, 2, and 3 are in the southeast desert region of Nevada. Moderate to hot temperatures, low humidity, and minimal annual rainfall typify the region. The region actually has four well-defined seasons, although they differ from the traditional view of seasonal variation. Summers display classic southwest desert characteristics. Daily high temperatures typically exceed 100°F with lows in the 70°F range. The summer heat is tempered somewhat by the extremely low relative humidity. However, it is not uncommon for humidity to increase markedly for several weeks each summer in association with a moist monsoonal flow from the south, typically during July and August. Aside from increasing the discomfort level, these moist winds also support the development of desert thunderstorms, which are frequently associated with significant flash flooding and/or strong downburst winds.

Winters, on the whole, are mild. Afternoon temperatures average near 60°F, and skies are mostly clear. Pacific storms occasionally produce rainfall in the southern Nevada desert, but in general, the Sierra Nevada Mountains of eastern California and the Spring Mountains immediately west of the Las Vegas Valley act as effective barriers to moisture. Snow accumulation is rare in the lower desert region. Flurries are observed once or twice during most winters, but snowfall of 1 inch or more occurs only once every 4 to 5 years. However, freezing temperatures do occur with some regularity. Based on the 1961 to 1990 period of record, the average first occurrence of 32°F in the fall is November 25; the average last occurrence is February 28.

The spring and fall seasons are generally considered ideal. Although rather sharp temperature changes can occur during these months, outdoor activities are seldom hampered. Strong winds are arguably the most persistent and provoking weather hazard experienced in the area. Winds over 50 miles per hour (mph) are infrequent but can occur with some of the more vigorous storms. Winter and spring wind events often generate widespread areas of blowing dust and sand. Strong wind episodes in the summertime are usually connected with thunderstorms, and are thus more isolated and localized. Prevailing wind direction is typically southwesterly, unless associated with a thunderstorm outflow.

Surface winds are characterized by prevailing southwesterly winds with an average speed of approximately 10 mph. Wind speeds are lowest during the winter season with an average of approximately 8 mph. Spring is typically the windiest season with an average wind speed of approximately 12 mph.

Figure 3-1 shows a wind rose for the Toquop area. The wind rose graphically depicts a plot of one year of hourly wind speed and vector recordings, from 1990, and should be representative of overall annual observations for any year. Wind data for the chart were taken from the National Weather Service station in Las Vegas (LAS), the nearest station with publicly available data.

Temperatures range from an average daily maximum of 60.2°F in January to 105.5°F in July. Average daily minimum temperatures range from 43.2°F in January to 67.2°F in July.

The region is one of the driest in the U.S., receiving an annual average precipitation of only 6.9 inches. Monthly precipitation ranges from 0.16 to 0.89 inch.

During the rainy period (July to September), local terrain influences both the winds and rainfall patterns. Moisture from the tropics enters the region from the south and east, interacts with local terrain-influenced upslope winds and intense surface heating, and produces high-altitude convective thunderstorms. These storms may produce significant rainfall, however, rainfall amounts vary considerably from location to location because of the spatial and temporal variation of these types of storm systems.

3.6.1.1.2 Physical Features of Site

Proposed Action. The Proposed Action power plant site would be approximately 12 miles northwest of Mesquite. The East Mormon Mountains lie west of the plant site; the plant would be approximately 5 miles east of the peaks and 3 to 4 miles east of the base of these mountains. The mountains run north-south, and the plant site would be east of the approximate midpoint of the mountain range. The elevation of the tallest peak is approximately 2,755 feet higher than the site.

The Toquop Wash runs from northwest to the southeast, and the South Fork Toquop Wash runs west to east past the plant site. Several other, less significant, drainages also run nearby the site and empty into the Toquop Wash. While these are dramatic physical features of the site, they are of little consequence in air quality considerations.

Alternative 1. The description of physical features for the Alternative 1 plant site is identical to that of the Proposed Action.

Alternative 2. The Alternative 2 power plant would be located approximately 11 miles northwest of the Proposed Action plant site, on the southern end of the Tule Desert. The desert is characterized by relatively level topography, bordered to the east and south by small mountains. This location is approximately 2 miles northwest of the peak of Jumbled Mountain, which rises approximately 800 feet above the site location.

Alternative 3. The description of physical features for the Alternative 3 plant site is identical to that of the Proposed Action.

3.6.1.1.3 Existing Air Quality. With no existing sources of man-made air emissions in the vicinity, the southern and northern plant sites are presumed to have similar existing air quality. All of Lincoln County is in full attainment of ambient air quality standards; that is, existing background concentrations for all criteria air pollutants are less than the maximum allowable ambient concentrations under Nevada and federal regulations. These criteria pollutants include oxides of

nitrogen (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter with mean aerometric diameter smaller than 10 microns (PM10), ozone (O_3) which is controlled by regulating the emissions of volatile organic compounds (VOCs) and NO_x, and lead.

Based on guidance from the Nevada Division of Environmental Protection Bureau of Air Quality (NDEP BAQ), the ambient impact analysis assumes that the existing background concentrations of all pollutants, except for PM10, are zero. This is reflective of the lack of existing emission sources in the vicinity. No monitoring data exist to establish more accurate background concentrations; however, given the lack of major transportation corridors or communities in the immediate vicinity of the site, and considering that all permitted air pollution sources in the vicinity were considered in the ambient impact analysis, any actual background concentrations are assumed to be very small compared to the localized, modeled impacts of the proposed facility combined with the other emission sources.

NDEP BAQ estimates that the background concentration of PM10 is up to 10.2 micrograms per cubic meter (ug/m^3). While no monitoring for ambient particulate levels has been conducted in the area, NDEP BAQ estimates that windblown dust caused by the hot, arid conditions of the site could reach this level.

Four designated Federal Class I air quality areas exist within 200 kilometers (125 miles) of the Proposed Action power plant site. These include Grand Canyon National Park, which is the nearest at 78 kilometers (49 miles) from the southern Toquop site, and the Sycamore Canyon Wilderness Area, Bryce Canyon National Park, and Zion National Park. The Lake Mead National Recreation Area is a designated Federal Class II air quality area and is approximately 48 kilometers (30 miles) south of the southern Toquop power plant site.

3.6.1.2 Pah Rah Parcel

Washoe County's climate is mild, with low humidity and rainfall. It is characterized as semi-arid to arid with average annual precipitation ranging from 4 to 16 inches. The average annual temperature in Reno is 48°F in the winter and 88°F in the summer.

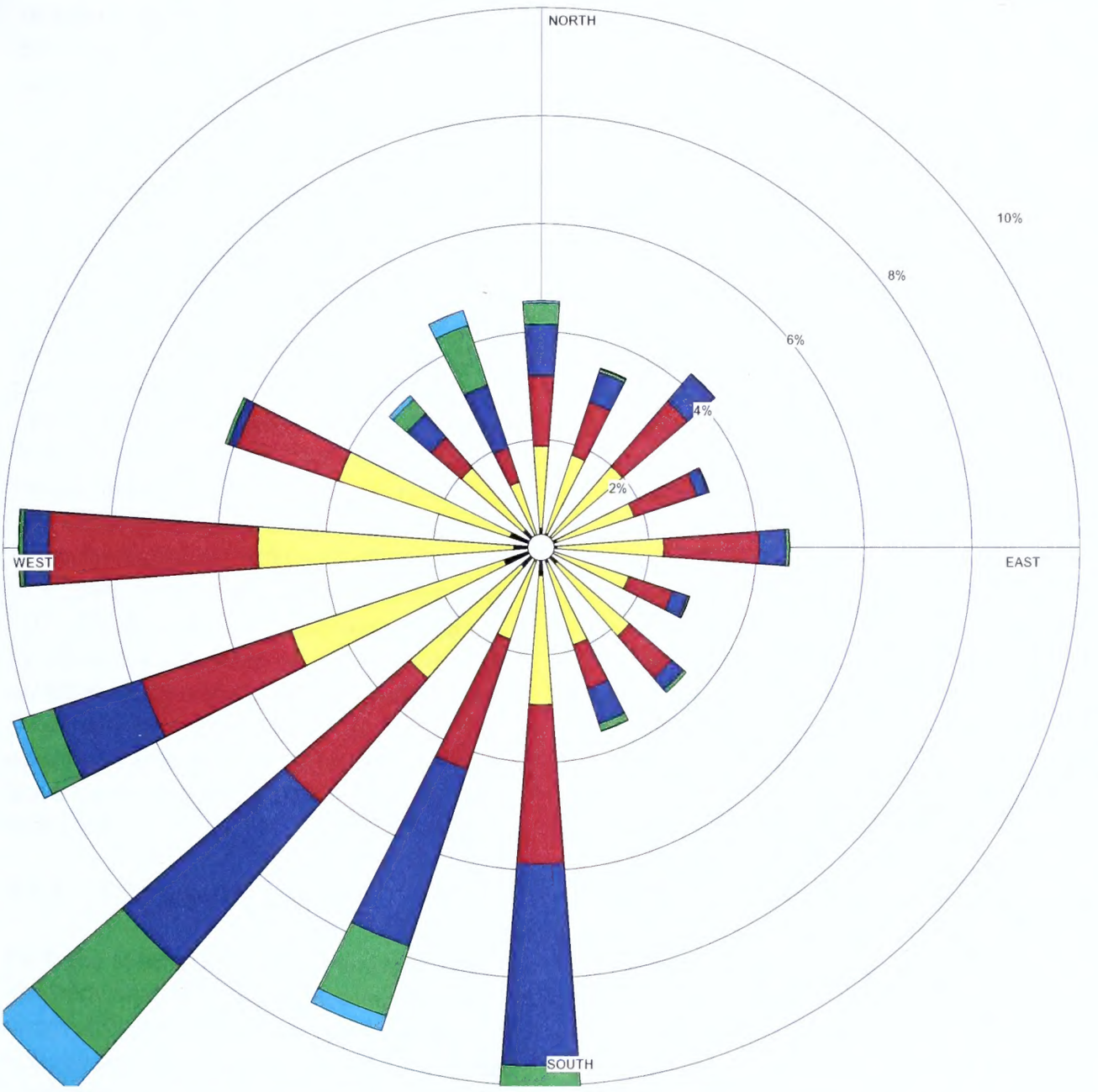
Portions of Washoe County are currently designated as non-attainment areas in meeting air quality standards for PM10 and CO, and all of Washoe County is designated as a moderate non-attainment area for ozone. The Truckee Meadows Hydrographic Basin (Reno/Sparks urban area) defines the boundaries for the PM10 non-attainment area. The boundaries for the CO non-attainment area are also considered to be the Truckee Meadows Basin. The Pah Rah parcel would be outside of the PM10 and CO non-attainment areas.

3.6.2 Noise

This section addresses existing noise sources and levels in the Toquop and Pah Rah areas. It also describes noise regulations applicable to development on BLM land and in Lincoln and Washoe Counties.

Project: Toquop Energy Facility

Station #23169 - LAS VEGAS/MCCARRAN INT'L ARPT, NV



Wind Speed (m/s)

- > 11.06
- 8.49 - 11.06
- 5.40 - 8.49
- 3.34 - 5.40
- 1.80 - 3.34
- 0.51 - 1.80

MODELER: McCarter	DATE **4/10/2002**
DISPLAY **Wind Speed**	UNIT **m/s**
AVG. WIND SPEED **4.55 m/s**	CALM WINDS **1.83%**
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1990** **Jan 1 - Dec 31** **Midnight - 11 PM**

Representative Wind Rose for the Toquop Area

Figure 3-1

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

Noise levels in the Toquop and Pah Rah areas are affected by numerous factors. These factors include: a site's general setting, such as isolated, rural, suburban, or urban; nature of the noise sources or activities occurring in those settings; proximity of the receptor to the noise source or activity; time of day; and various attenuating factors that can mute or interrupt noise waves, such as vegetation, topographic features, buildings, and atmospheric conditions.

Noise levels are measured in units of A-weighted decibels (dBA), which are roughly proportional to loudness as perceived by the average person. Common sound levels covering the full range of human hearing vary from about 10 to 110 dBA. Examples of the variation in noise levels follow: 25 to 35 dBA in rural or remote areas with little human activity; 40 to 50 dBA in a typical office; 50 to 60 dBA in a suburban neighborhood; 60 to 80 dBA along a busy city sidewalk; 80 to 90 dBA from a lawnmower (at the operator); and about 90 dBA from a large truck (at a distance of 50 feet) (USIBWC et al., 2000).

3.6.2.1 Toquop Area

Both the southern plant site and the northern plant site are located within an undeveloped area. Except for the high-voltage transmission lines located near the southern plant site, the dirt road near both the southern and northern plant sites, and the disturbance near the northern plant site from well drilling, no aboveground human-made development exists in the area. The transmission lines emit a hum. No other human-caused noise sources appear to exist in the area, except for overflights of military airplanes (both jet and propeller) and helicopters, which are noisy. The two sites (southern and northern), located approximately 11 miles and 22 miles, respectively, from I-15, are remote from any urban area.

Typical noise levels in the area are estimated to be between 25 and 50 dBA, depending on the distance from the transmission lines. No residences, schools, or parks (considered sensitive noise receptors) are located in the area.

The Toquop parcels are currently public land under the jurisdiction of the BLM, and are subject to the management guidance included in the Caliente MFP. The Caliente MFP does not contain noise regulations or standards (BLM, 1999).

If either the southern or northern Toquop parcel is exchanged for the Pah Rah parcel, it would be under the jurisdiction of Lincoln County. The Lincoln County Zoning Ordinance does not contain noise regulations or standards (Lincoln County, 2001b).

3.6.2.2 Pah Rah Parcel

The Pah Rah parcel is located within a relatively undeveloped area and no development exists on the Pah Rah parcel. Two 345-kV electric transmission lines are aligned north of the site. A dirt road leads to the transmission lines. I-80 is 1.25 miles south of the parcel. The Union Pacific Railroad tracks are on the south side of I-80. The transmission lines emit a hum that is not audible from the parcel, but the Union Pacific Railroad and I-80 traffic generate noise that is audible from the parcel. South of the site and north of I-80 is a wooden single-pole 60 kV electric transmission line. The Truckee River is on the south side of I-80 and generally parallels the freeway in this area. A mine is located in the mountains south of the Pah Rah parcel on the south side of I-80.

The closest community to this parcel is Wadsworth, several miles to the east.

Typical noise levels within the Pah Rah parcel are estimated to be between 25 and 32 dBA, depending on the location within the site and wind direction. No residences, schools, or parks (considered sensitive noise receptors) are located in the area.

The Pah Rah parcel is currently privately owned land, and is subject to the regulations included in the Washoe County Comprehensive Plan (Washoe Plan). The Washoe Plan does not contain noise regulations or standards (Washoe County, 2000a).

If the parcel is exchanged for either the southern or northern Toquop parcel, it would come under the jurisdiction of the BLM. The BLM's Carson City Field Office Consolidated Resource Management Plan (CRMP) does not contain noise regulations or standards (BLM, 2001a).

3.7 Visual Resources

The existing landscape in the vicinity of the Toquop area and the Pah Rah parcel is described in this section. It also discusses the BLM's Visual Resource Management (VRM) Program.

The BLM has developed a system (the VRM Program) for evaluating the visual resources of a given area to determine what degree of protection, rehabilitation, or enhancement is desirable and possible. The BLM is concerned with managing visual resources equally with other resources and attaining acceptable levels of visual impact without unduly reducing commodity production or limiting overall program effectiveness.

The objective of VRM is to manage public lands in a manner that will protect the quality of the scenic (visual) values of these lands. According to BLM policy, "...visual design considerations shall be incorporated into all surface disturbing projects regardless of size or potential impact. Emphasis shall be placed on providing these inputs during the initial planning and design phase so as to minimize costly redesign and mitigation at later phases of the project design and development..."

Perception of visual quality in a landscape is based on the following common principles:

- Landscape character is determined by four basic visual elements (form, line, color, and texture), which are present in every landscape and exert varying degrees of influence.
- As the influence exerted by these elements increases, the landscape becomes more interesting.
- As the visual variety in a landscape increases, the landscape becomes more aesthetically pleasing. Variety in the landscape without harmony is considered unattractive; landscape alterations that create disharmony are considered unattractive (BLM, 1980).

The objectives for four VRM Classes are the following:

- **Class I Objective.** The objective of this class is to preserve the existing character of the landscape. Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention.

- **Class II Objective.** The objective of this class is to retain the existing character of the landscape. Authorized actions may not modify existing landscapes or attract the attention of casual viewers.

- **Class III Objective.** The objective of this class is to partially retain the existing character of the landscape. Authorized actions may alter the existing landscape, but not to the extent that they attract or focus attention of the casual viewer.

- **Class IV Objective.** The objective of this class is to allow management activities that involve major modification of the existing character of the landscape. Authorized actions may create significant landscape alterations and would be obvious to casual viewers. However, an attempt should be made to lessen the impact of these activities through careful location, reducing landscape disturbance, and repeating the basic elements (form, line, color, and texture).

3.7.1 Toquop Area

Sites of proposed project features in the Toquop area appear as relatively flat land (except where the Toquop Wash would be crossed) that exhibits hues of creams, tans, and grays. Vegetation onsite and along the access road includes species such as Cholla cactus, Mormon tea, galleta grass, Joshua trees, creosote, and white bursage. This vegetation adds texture and contrast, and provides some visual interest to the relatively level landscape. The southern and northern Toquop parcels appear undeveloped except where three high-voltage transmission lines cross a corner of the southern parcel.

The East Mormon Mountains to the west are clearly visible from the southern plant site. Beyond the East Mormon Mountains, the Mormon Mountains (approximately 5.5 miles west of the southern Toquop parcel) and the Mormon Mountains Wilderness Study Area (3.75 miles west of the southern Toquop parcel) are visible from the southern Toquop parcel. The East Mormon Mountains are at approximate elevation 4000 feet in this area and the Mormon Mountains range from elevations 4200 to 5200 feet. However, further south, the East Mormon Mountains are taller and obstruct views of the Mormon Mountains from the southern plant site. The East Mormon Mountains would also obstruct views of the plant site from the south end of the Mormon Mountains.

Neither the southern or northern Toquop parcel is visible from I-15.

The BLM Las Vegas office currently manages the land that includes the southernmost 5 miles of the project access road (from I-15 north to the Clark County/Lincoln County boundary) as VRM Class III. The BLM Ely office currently manages the land that includes the southern and northern Toquop parcels, transmission line, water pipeline, natural gas connection, wellfield, and the access road from the Clark County/Lincoln County boundary north to the two project sites as VRM Class IV.

3.7.2 Pah Rah Parcel

The Pah Rah parcel consists of steep-sided mountain slopes. No roads, transmission lines, or other human-made development exist on the site. Section survey markers are present, but are not apparent to the untrained eye. Vegetation consists of low-lying desert vegetation common to the area. Loose dark-colored rock is present

along the hillsides and provides a contrast to the lighter-colored slopes. An undeveloped hiking trail along the west side of the slope exists, but is not noticeable from a distance. No recreational or other hiking trails exist on the Pah Rah parcel, although numerous game trails lead to the parcel and cattle paths exist below it. The undeveloped nature of the parcel reflects the natural character of the mountains in the area. In views of the parcel from the north, the colors represented are tans, creams, and warm browns. Low-lying desert vegetation is visible, as is loose rock on the slopes.

Two 345-kV transmission line corridors exist to the north of the parcel. A mine exists to the south on the south side of I-80. I-80 is approximately 1.25 miles south of the parcel and is visible from the southern edge of the top of the mesa.

Views from the top of the Pah Rah parcel include the cement plant in Fernley to the east, the diatomite mine and associated mining scars in the mountains to the south, I-80 to the south, the Truckee River on the south side of I-80, and the Union Pacific Railroad tracks, also on the south side of I-80. Views to the north are of other mountains, the Olinghouse Mine and its heap leach area, open space (undeveloped land), and the two 345-kV transmission line corridors.

The nearest freeway offramp to the Pah Rah parcel is the Derby Dam exit, approximately 1.5 miles southwest of the site. From this viewpoint looking north, the parcel appears undisturbed. From the south, the slopes of the parcel are shades of pinks, grays, and dark brown. No vegetation appears visible, and no shades of green are visible.

The Pah Rah parcel is privately owned land; however, the BLM has classified the area that includes the Pah Rah parcel according to its VRM Program. Roughly the northwest quarter of the Pah Rah parcel is designated VRM Class IV, and the remainder of the parcel is designated VRM Class III. Class IV lands surround the parcel to the north, northwest, and west. Class III lands surround the parcel to the northeast, east, southeast, south, and southwest (BLM, 2001a).

3.8 Recreation Resources

This section describes existing recreation resources in the vicinity of the Toquop area and Pah Rah parcel.

3.8.1 Toquop Area

The Toquop area is relatively remote. Traditional use of the area has been by small game bird (quail) and big game hunters during identified seasons. Several bird guzzlers and springs are present west of the area in the East Mormon Mountains. Hunting and trapping of fur bearers also occurs in the area. Seasonal wildflower sighting, bird watching, and primitive camping are springtime recreational activities.

The southern and northern Toquop parcels are approximately 15 miles from the Logandale Trails System, a multiple use motorized and non-motorized trails play area. The parcels are also approximately 20 miles north of the north arm of Lake Mead. The closest recreation area is Overton Beach on the north arm of the lake. Lake Mead is part of the Lake Mead National Recreation Area, which encompasses Lake Mead, Lake Mohave, and both federal and non-federal land.

The popularity of special use vehicles over the last 20 years has encouraged casual 4-wheel drive exploration of primitive and remote public land areas. The Toquop Wash is used by OHVs year-round and by quail hunters in the fall. OHV use in the Toquop area has been increasing over the years. Several high-speed competitive OHV events have occurred in the area since the late 1970s, including small truck/car races conducted by the Silverdust Racing Association, the ACERBIS Nevada Rally for motorcycles, several Best in the Desert Racing Association truck/car/motorcycle/ATV events, and the Nevada 2000 OHV race.

In addition, non-speed, non-competitive, street-legal, off-highway-capable, self-guided motorcycle scenic touring is a popular venue in back country areas. The Caliente/Tule Desert/Mormon Mountains area is used for several self-guided motorcycle scenic tours.

Because of the rapid urban expansion of Las Vegas and Clark County and the resultant loss of traditional OHV competitive areas, and air quality management issues, the BLM Las Vegas Field Office expects that areas such as the Tule Desert could potentially be used for competitive and organized OHV events in the future (Bruno, 2002).

3.8.2 Pah Rah Parcel

The Pah Rah parcel is relatively remote. The remote nature of the parcel and its private ownership limits the amount of recreation opportunities available to the public. Its remoteness, particularly the lack of direct vehicular access and its steep terrain, probably are the overriding reasons for the lack of recreational use.

The Pah Rah parcel is approximately 13 miles south of Pyramid Lake and 2 miles north of the Truckee River. Pyramid Lake lies within the Pyramid Lake Reservation (Tribal lands). A hot spring exists there. Fishing also occurs at Pyramid Lake. Tours are given at the fish hatcheries. A marina and a visitor center with a store are located at the lake.

Picnicking, fishing, and rafting occur at various locations along the Truckee River. Opportunities for recreational trails are limited in the Truckee Canyon planning area because of its steep terrain and remote location (Washoe County, 2000b).

3.9 Land Use, Prime or Unique Farmlands, and Rangelands

3.9.1 Toquop Area

3.9.1.1 Existing Land Use and Land Ownership

3.9.1.1.1 Project Site Land Use and Ownership. The Toquop area is public land administered by the BLM. The southern Toquop parcel is within Assessor Parcel Number (APN) 08-251-01. This parcel is described as Section 36, T11S, R69E in Lincoln County, Nevada. The southern Toquop parcel is currently uninhabited, with development restricted to a series of dirt roads and utility corridors. Properties immediately adjoining the southern Toquop parcel are also administered by the BLM.

A title report was prepared for the area generally covered by: 1) the access road from I-15 north to the southern Toquop parcel; 2) the southern Toquop parcel; 3) the western pipeline alignment; 4) the northern Toquop parcel; 5) the majority of the wellfield area; and 6) the northern half

of the eastern pipeline alignment (Stewart Title of Northern Nevada, 2001). Table 3-4 lists the existing easements and rights-of-way identified.

3.9.1.1.2 Transportation and Urban Uses. The transportation corridor closest to the Toquop parcels is I-15, located approximately 11 miles from the site of the Proposed Action. I-15 is a major highway that passes through Las Vegas and connects Salt Lake City to Los Angeles. An unimproved dirt road leads to the southern and northern Toquop parcels from I-15.

TABLE 3-4
Easements and Rights-of-Way in the Toquop Area

Affected Project Location	Easement/Right-of-Way
Southern Toquop parcel	Easements and rights-of-way for power transmission lines, oil and gas pipelines, oil and gas facilities, fiber optic facilities, and incidental purposes
Access road from southern Toquop parcel south to Clark County border	Easements and rights-of-way for power transmission lines, oil and gas pipelines, oil and gas facilities, fiber optic facilities, coal slurry pipeline, telephone and telegraph line and facilities, communication site, radio repeater site, microwave radio relay site, water gauge system (rain gauge), access road, and incidental purposes
Access road from Clark County border south to I-15	Easements and rights-of-way for highway, communication site, microwave radio relay site, underground phone line, vortac site, material sites, access road, and incidental purposes, and protective easement
	Matters relating to an airport lease in favor of the Federal Aviation Administration
	Matters relating to a land conveyance in favor of the City of Mesquite
	Easements and rights-of-way for wind monitors on Flat Top and Mormon mesas and incidental purposes
Northern Toquop parcel	Easements and rights-of-way for water facility and incidental purposes
Northern portion of eastern pipeline alignment	Unrecorded easements and rights-of-way for water facility and incidental purposes
Western pipeline alignment	Easements and rights-of-way for water facility and incidental purposes
Wellfield area	Easements and rights-of-way for water facility and incidental purposes
Southern Toquop parcel	Terms, conditions, restrictions, covenants, and provisions of proposed land exchange
All Toquop project areas except wellfield area	Terms, conditions, restrictions, covenants, and provisions set forth in application dated June 15, 2001, filed by Toquop Energy, Inc., and Lincoln County, Nevada, with BLM
Areas along Kern River Gas Pipeline affected by project features	Terms, conditions, restrictions, covenants, and provisions as set forth in "Construction, Operating and Maintenance Agreement" dated July 17, 1998, between Kern River Gas Transmission, a Texas General Partnership, and Williams Communications, Inc. a Delaware Corporation, recorded February 25, 1999

Source: Stewart Title of Northern Nevada (2001).

The urban center nearest the Toquop parcels is the City of Mesquite, approximately 12 miles to the southeast. Other than electrical transmission, fiber optic communication, and natural gas lines, no residential, commercial, or industrial land uses are located within or adjacent to the two Toquop parcels.

3.9.1.1.3 Mining Uses. BLM's databases contain no records of mining claims, mineral leases, or mineral rights-of-way within the project area. Patented and unpatented claims for gypsum have occurred offsite, approximately 0.5 mile to 7 miles away.

Current exploration activities include several small barite veins that were prospected about 4.5 miles northwest of the southern power plant site.

The Snowhite gypsum deposit occurs about 2 miles north of the southern power plant site on the northeast side of the Toquop Wash. Additional recent exploration for gypsum has occurred 4 miles southwest of the southern power plant site.

Exploration for minerals continues in the area—primarily for gypsum. The potential for minerals supports continued exploration. However, the current development potential for these mineral resources is low based on the availability of sources closer to economic centers and prices.

3.9.1.2 Designated Land Use

BLM-designated land uses in the project area include grazing allotments, ACECs, WSAs, and critical habitat. These land uses are described in the appropriate sections of this *Proposed Land Disposal Amendment to the Caliente MFP and Final Environmental Impact Statement for the Toquop Energy Project.*

The Toquop area is designated "A-5" (agriculture with a 5-acre minimum) according to Lincoln County. The "A" agricultural district is established for areas particularly suited for raising crops and animals and other related agricultural activities. Permitted uses include those related to agricultural uses. Uses subject to special use permit include agricultural industries; dumps; forest industries; golf courses; livestock feed yards; recreational resorts; and public utility or public service buildings, structures, and uses (Lincoln County, 1990).

3.9.1.3 Prime or Unique Farmlands

Prime farmland, as defined by the U.S. Department of Agriculture, is that land best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high crop yields if acceptable farming methods are used. Prime farmland produces the highest yields with minimal inputs of energy and money, and farming it results in the least damage to the environment. Prime farmland is either currently used for producing food or fiber or is available for this use. Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods or frequently flooded during the growing season. The slope ranges mainly from zero to 6 percent (NRCS, 1990).

Approximately 94,400 acres (nearly 3.5 percent of Lincoln County [south part] soil survey area) would meet the

requirements for prime farmland if an adequate and dependable supply of irrigation water were available and the soils were reclaimed to reduce salinity and alkalinity. None of the soil map units on the Toquop parcels meet the soil requirements for prime farmland (NRCS, 1990).

The Virgin River area soil survey area, which includes the access road from I-15 heading north for roughly half the distance to the southern Toquop parcel (8 miles), is not prime farmland (NRCS, 1970).

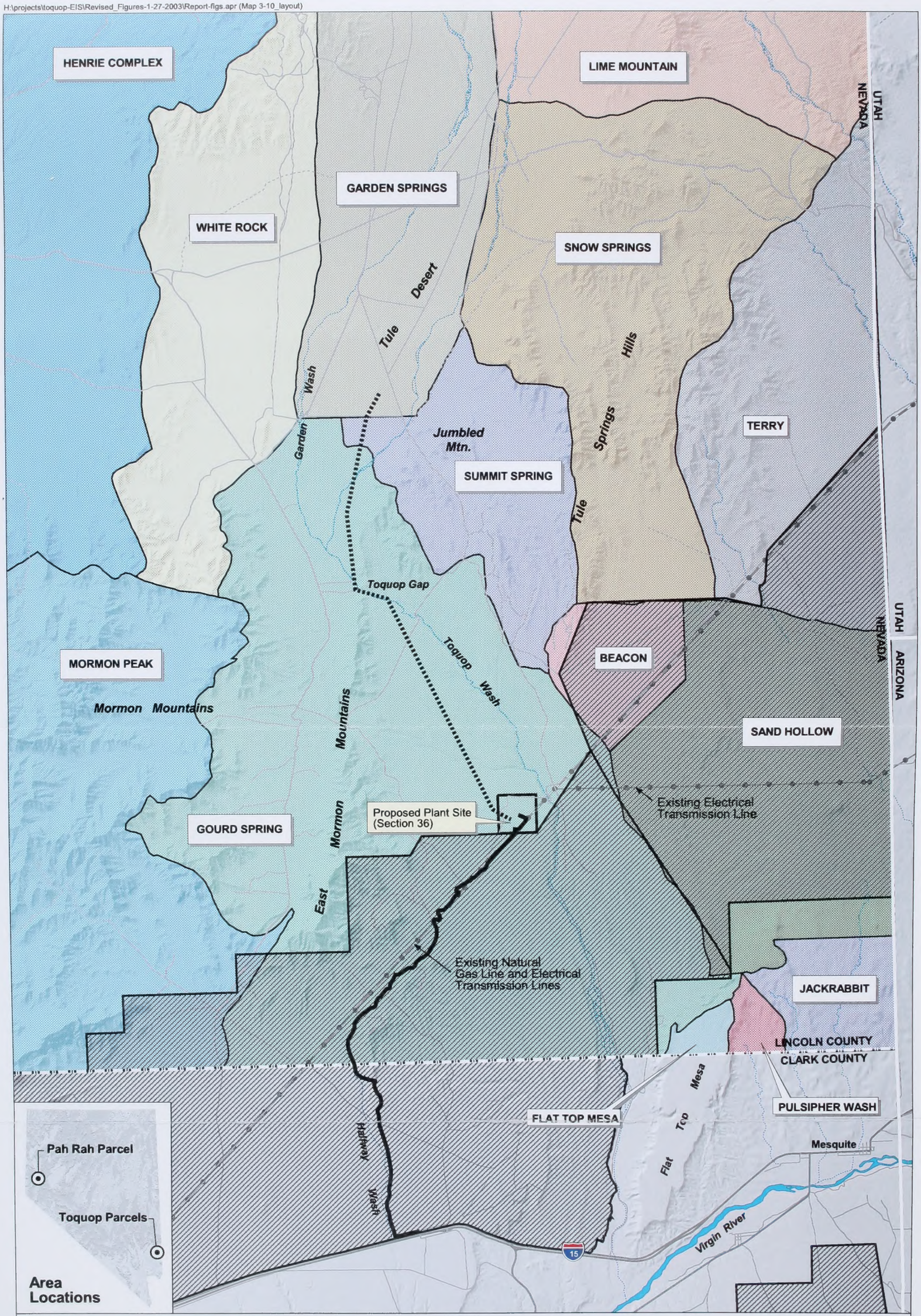
Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. It has the special combination of soil qualities, location, growing season, and moisture supply needed for the economic production of sustained high yields of a specific high-quality crop when treated and managed by acceptable farming methods. Unique farmland is used for a specific high-value food or fiber crop; has an adequate supply of available moisture for the specific crop because of stored moisture, precipitation, or irrigation; and has a combination of soil qualities, growing season, temperature, humidity, air drainage, elevation, aspect, and other factors, such as nearness to markets, that favor the production of a specific food or fiber crop. No soils in Nevada are currently recognized as unique farmland (NRCS, 1990).

3.9.1.4 Rangelands

Rangeland provides many important resource values: it acts as a vast watershed and provides habitat for wildlife, livestock forage, and opportunities for recreation. The resource values of rangeland are intricately interrelated and are often directly affected by rangeland management. Proper management of rangeland depends on many factors: the season of grazing use, the species of grazing animal, the intensity and distribution of grazing, and the range resource potential (NRCS, 1990).

Approximately 98 percent of the acreage in the Lincoln County, Nevada, South Part, soil survey area is rangeland. This survey area includes the southern and northern Toquop parcels, the alignments, the wellfield, and the access road from the southern Toquop parcel heading south for approximately 7 miles. All of the wellfield/pipeline are located within portions of the White Rock (2,880 animal unit months [AUMs]), Garden Springs (2,809 AUMs), Summit Spring (715 AUMs), Snow Springs (3,567 AUMs), or Gourd Spring (3,458 AUMs) grazing allotments (see Maps 3-10, 3-11, and 3-12 for the Proposed Action and Alternative 3, Alternative 1, and Alternative 2, respectively). The allotments are shown for each alternative. These allotments are utilized during the fall, winter, and spring. The southern parcel lies within the Gourd Spring Allotment. This parcel has been removed from livestock management because of the Gourd Springs ACEC boundary fence. The northern parcel lies within the southern portion of the Garden Springs Allotment. Livestock grazing is the principal agricultural use of the rangeland (NRCS, 1990).

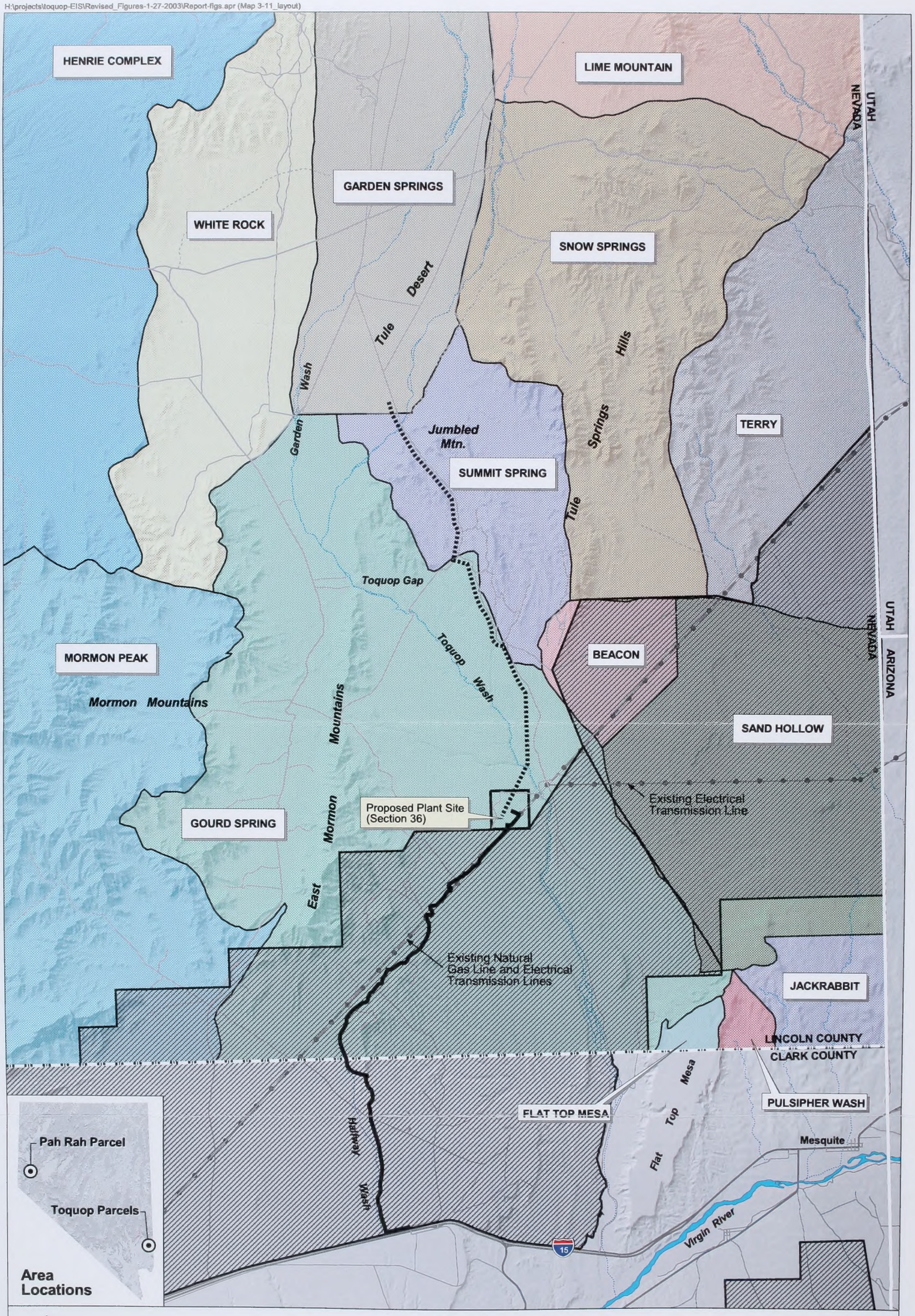
An Environmental Assessment (EA) was recently prepared that addressed the Gourd Springs ACEC boundary fence. The fence was completed in December 2001. It is located along the western section line of Section 36, T11S, R69E (the southern Toquop parcel). The purpose of the fence is to restrict livestock from entering the Mormon Mesa ACEC, which is closed to livestock (BLM, 2001b).



Toquop Energy Project
Grazing Allotments
Proposed Action and Alternative 3
(Proposed Action - Water Cooled
Alternative 3 - Air Cooled
All other features are the same)

Map 3-10

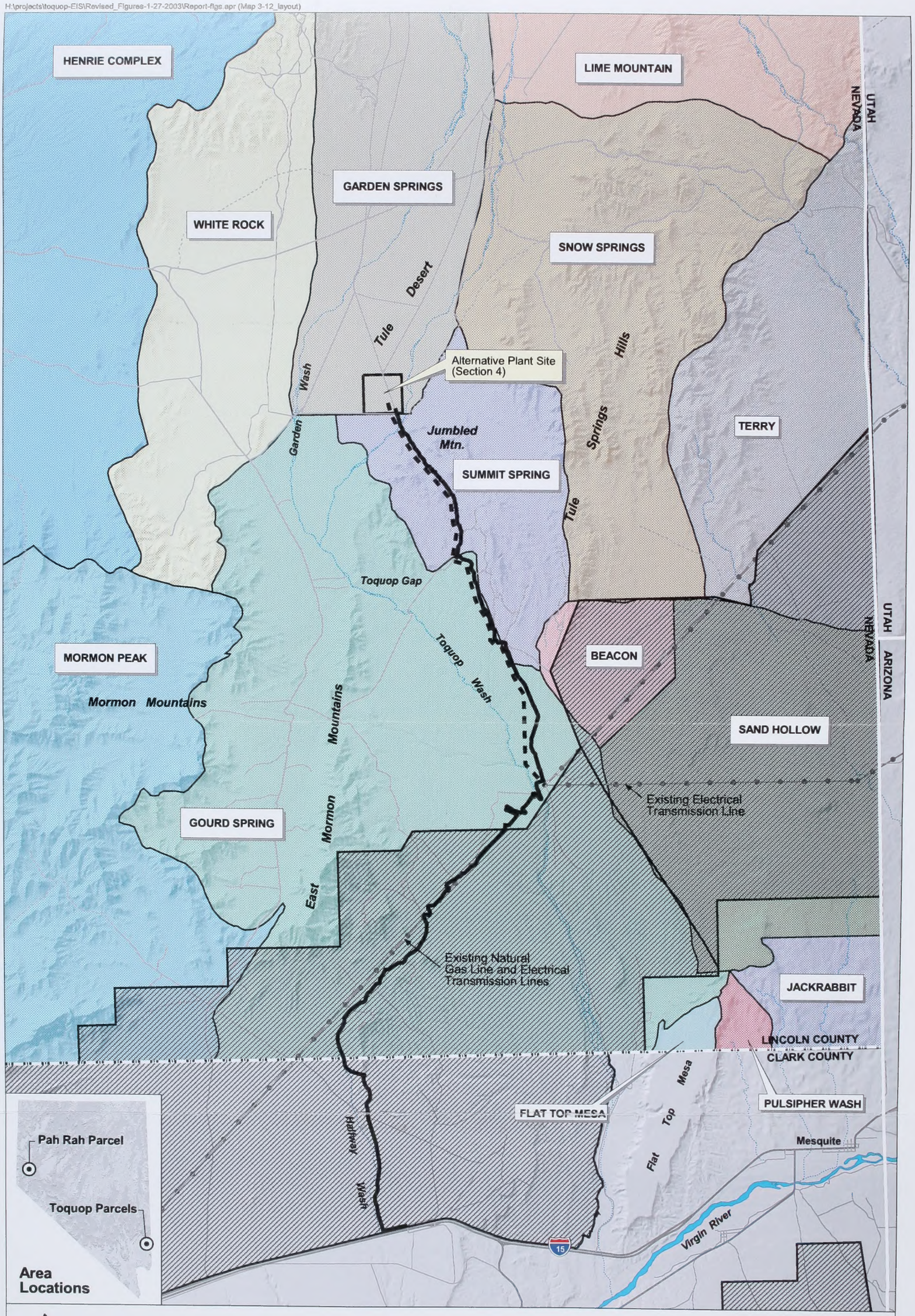
CH2MHILL



Toquop Energy Project
Grazing Allotments
Alternative 1

Map 3-11

CH2MHILL



Toquop Energy Project
Grazing Allotments
Alternative 2

Map 3-12

CH2MHILL

Most of the acreage in the Virgin River soil survey area, which includes the access road from I-15 heading north for roughly half the distance to the southern Toquop parcel (8 miles), is rangeland. This area lies within the Mormon Mesa Allotment administered by the Las Vegas Field Office. The Mormon Mesa Allotment has been closed to livestock management because of the Record of Decision for the Management of Desert Tortoise Habitat EIS.

3.9.2 Pah Rah Parcel

3.9.2.1 Existing Land Use and Land Ownership

3.9.2.1.1 Project Site Land Use and Ownership. The Pah Rah parcel is owned by Nevada Land and Resource Company, LLC (NLRC) (see Map 3-13). The parcel is APN 84-040-12, described as Section 9, T20N, R23E in Washoe County, Nevada. The Pah Rah parcel sets atop a mesa that is uninhabited. No activity on the parcel is visible other than the placement of survey markers. Properties immediately adjoining the Pah Rah parcel to the north, east, south, and west are administered by the BLM. Properties adjoining the Pah Rah parcel to the northwest, northeast, and southeast are owned by NLRC. No roads, rights-of-way, or easements are known to occur on the Pah Rah parcel. Road rights-of-way are located west, northwest, and north of the parcel, and pipeline rights-of-way are located south of the parcel. High-voltage electric transmission lines are located north and south of the parcel.

3.9.2.1.2 Transportation and Urban Uses. The transportation corridor closest to the Pah Rah parcel is I-80, located approximately 1.25 miles south of the parcel. I-80 is a major east-west interstate freeway. An unimproved dirt road leads to within 0.25 mile of the northwest corner of the Pah Rah parcel from State Route 447 (SR 447), which intersects I-80 near Wadsworth, Nevada.

The urban center nearest the Pah Rah parcel is the Pyramid Lake Indian Reservation community of Wadsworth, 5.5 miles to the east. No residential or commercial land uses are located in the vicinity of the Pah Rah parcel. An industrial use (a gold and silver mine) exists approximately 2 miles north, and another mine (diatomite) exists approximately 3 miles south of the Pah Rah parcel on the south side of I-80. The Union Pacific Railroad also maintains an active railroad line that generally parallels I-80 and the Truckee River near the Pah Rah parcel.

3.9.2.1.3 Mining Uses. Because the parcel is privately owned land, it has not been available for mining by the public. There are no records or evidence of past prospecting activity on the Pah Rah parcel. No gold or other economic mineral occurrences have been identified on the Pah Rah parcel.

The most important industrial minerals found near the Pah Rah parcel are gold and silver, limestone for cement manufacturing, and diatomite. Cement manufacturing also requires small amounts of clay and gypsum which are obtained locally. Aggregates such as sand, gravel, pumice, and minor perlite have been mined west of the Pah Rah parcel, near Reno, and to the east near Fernley, Nevada (BLM, 2001f).

3.9.2.2 Designated Land Use

The Pah Rah parcel is zoned A-11 (Agricultural Deferred). Agricultural

zoning refers to onsite production of plant and animal products by agricultural methods, including agricultural processing, sales, and production; animal slaughtering; crop production; forest products; game farms; and produce sales (Washoe County, 2000c).

The Pah Rah parcel is located within a grazing allotment area identified by the BLM (2001a).

3.9.2.3 Prime or Unique Farmlands

The definition of prime farmland in Washoe County is similar to that for Lincoln County except that the slope ranges mainly from zero to 4 percent in Washoe County (south part) (NRCS, 1979). About 30,000 acres (3 percent of Washoe County [south part] soil survey area) meets the soil requirements for prime farmland provided that adequate irrigation water is available. None of the soil map units on the Pah Rah parcel meet the soil requirements for prime farmland (NRCS, 1979).

No soils are currently recognized as unique farmland in Nevada (NRCS, 1990).

3.9.2.4 Rangelands

The objective in range management is to manage grazing so that the plants growing on a site are approximately the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of water erosion and soil blowing. Sometimes, however, a range condition below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources (NRCS, 1979).

The soils within the Pah Rah parcel, (the Oppio-Rezave-Rock outcrop association, Osobb, Rezave-Fireball association, and Bombadil-Hefed-Rubble land association) are used as, or are suitable for, rangeland (NRCS, 1979).

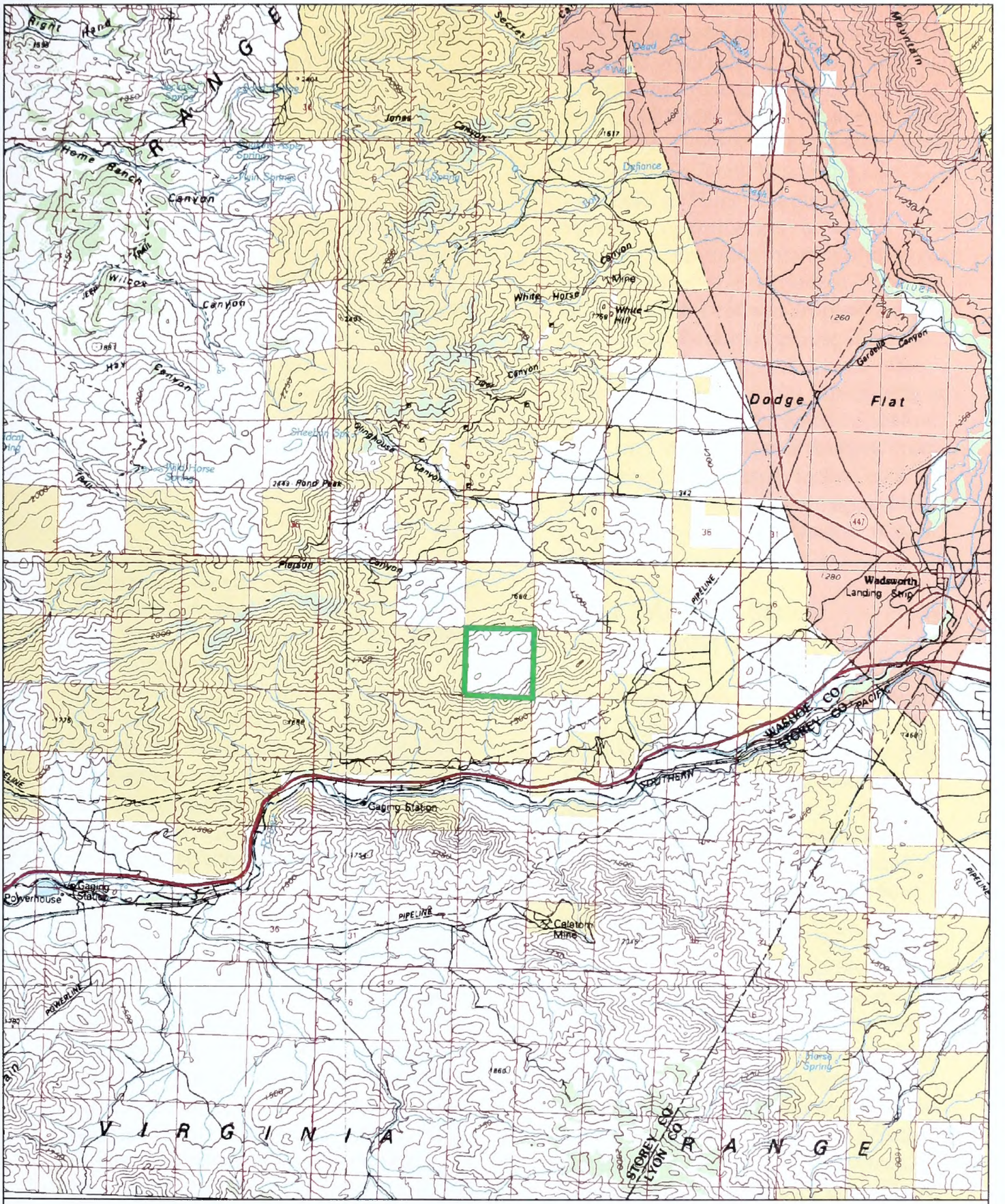
The Pah Rah parcel lies within the Olinghouse Grazing Allotment, with 696 AUMs. Grazing utilization levels are maintained at 55 percent or less to preserve the existing ecological condition and trends. An annual allowance of 182 AUMs exists within this allotment to maintain existing mule deer habitat. No evidence of grazing was observed on the parcel during the spring field reconnaissance (BLM, 2001b).

3.10 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers

3.10.1 Toquop Area

3.10.1.1 Wilderness Study Areas

The Proposed Action and all alternatives do not lie within a Wilderness Area, Wilderness Study Area (WSA), or Instant Study Area (ISA). Three WSAs are located north and west of the proposed locations of project features associated with the Toquop Energy Project. These include the Clover Mountains WSA (NV-050-139), the Meadow Valley Range WSA (NV-050-156), and the Mormon Mountains WSA (NV-050-161). Portions of all three WSAs have been recommended as suitable for wilderness designation by the BLM (BLM, 1991).



N

0 1 2 3 Miles

Sources: BLM 1:100,000 scale Land Ownership Data
USGS 1:100,000 scale DRG - Reno

Legend

- Pah Rah Property
- Bureau of Land Management
- Tribal Lands
- Private

Land Status in the Vicinity of the Pah Rah Property

Township 20 North,
Range 23 East, Section 9

Map 3-13

CH2MHILL

H:\projects\toquop-water_toquop-eis.apr (Pah Rah Property Layout)

The Mormon Mountains WSA is closest to the southern Toquop parcel. This 162,886-acre WSA is 3.75 miles west of the southern parcel. The western water pipeline alignment is approximately 1 mile east of the Mormon Mountains WSA. The northern Toquop parcel is approximately 5 miles east of the Mormon Mountains WSA. The potential wellfield abuts the Mormon Mountains WSA. Maps 3-14, 3-15, and 3-16 show lands in the project area that have been designated as WSAs and Areas of Critical Environmental Concern (discussed in Section 3.10.1.2), and locations of project features for the Proposed Action and Alternative 3, Alternative 1, and Alternative 2, respectively.

The BLM conducted a statewide wilderness inventory in 1979 and 1980. In that inventory, the Tule Desert (NV-050-01R-29), Lime Mountain (NV-050-0159), Tule Springs Hills (NV-050-0180), Hollow Wash (NV-050-01R-30), and Lone Mesa (NV-050-210) units were inventoried and dropped from further consideration as wilderness. According to the inventory report, the Tule Desert Unit included, "...a highway, paved roads, reservoirs, structures and communication sites (which) divide the area into parcels of less than 5, 000 acres each and clearly leave the unit in an unnatural condition..." The report also stated that the area had little topographic screening and did not have outstanding opportunities for recreation. The Lime Mountain Inventory Unit (NV-050-0159) was dropped from further consideration as wilderness because the area did not have an outstanding opportunity for solitude because of insufficient vegetative screening. In addition, recreation opportunities in the area were not found to be outstanding. The Tule Springs Hills Unit was dropped because the area had been impacted by numerous mining claims and scars, roads and ways, pipelines, and water tanks found throughout the entire unit. In addition, the unit lacked sufficient vegetative screening to adequately screen the intrusions found within the unit. The Tule Springs Hills Unit provides recreation opportunities; however, "...other areas in the vicinity offer higher quality recreation experiences." The Hollow Wash Unit was dropped from further consideration because it lacked vegetative screening and did not offer outstanding opportunities for solitude and for primitive and unconfined recreation. The Lone Mesa Unit was dropped from consideration because it lacked both naturalness and outstanding opportunities for primitive and unconfined recreation. (BLM, 1979).

3.10.1.2 Areas of Critical Environmental Concern

The Federal Land Policy Management Act of 1976 (FLPMA) requires that priority be given to the designation and protection of ACECs. An ACEC designation is the principal BLM designation for public lands where special management is required to protect important natural, cultural, and scenic resources, or to identify natural hazards.

Special Management Areas (SMAs) for desert tortoise were proposed as three ACECs by BLM in its 1999 *Proposed Caliente Management Framework Plan Amendment* (MFPA) and *Final Environmental Impact Statement for the Management of Desert Tortoise Habitat.* The three ACECs are: Kane Springs, Mormon Mesa, and Beaver Dam Slope (BLM, 1999). The Mormon Mesa and Beaver Dam Slope ACECs are located nearest to the two Toquop parcels and alignments. The Kane Springs ACEC is

approximately 28 to 35 miles west of the two Toquop parcels and alignments. Maps 3-10, 3-11, and 3-12 show lands in the project area that have been designated as ACECs.

The southern Toquop parcel is not located within the Mormon Mesa ACEC, but borders it. Except for the northernmost 0.9 mile, the 14.4-mile-long access road to that parcel from the south is within the Mormon Mesa ACEC. That portion of the access road in the Mormon Mesa ACEC consists of 5.2 miles in Clark County and 8.3 miles in Lincoln County. The Las Vegas Field Office of the BLM is responsible for administering ACEC resource constraints in the Clark County portion, while the Ely Field Office of the BLM is responsible for the Lincoln County portion. The access road and eastern and western utility alignments (associated with the Proposed Action and three action alternatives) between the southern and northern Toquop parcels are not located within an ACEC. The Beaver Dam ACEC is approximately 0.25 to 0.5 mile east of the eastern alignments, depending on location along the alignment. The access road between the northern and southern parcels, and the eastern and western utility alignments, are located within tortoise habitat (BLM, 2001d). However, a 3.5-mile portion of the access road for Alternative 2 and a 0.5-mile portion of the utility alignment for Alternative 2 are located in FWS "critical" habitat for the desert tortoise.

The MFPA indicates that management plans would be prepared for the ACECs. The plans would include land management prescriptions with the intent of recovering the Mojave population of the desert tortoise. Management directions for the ACECs address such issues as vegetation, wildlife, grazing, wild horses, and land disposal and withdrawals. The management direction applicable to the proposed project is to grant access roads to private parcels, federal oil and gas leases, and mining claims based on NEPA analysis and Section 7 consultation.

Management direction is also proposed for desert tortoise habitat outside of the ACECs to improve that habitat and be consistent with the recovery efforts by other agencies (BLM, 1999). The FWS-designated "critical" habitat area will be adjusted to reflect BLM's ACEC areas when all applicable (all states') land use plans for desert tortoise habitat have been amended.

3.10.1.3 Wild and Scenic Rivers

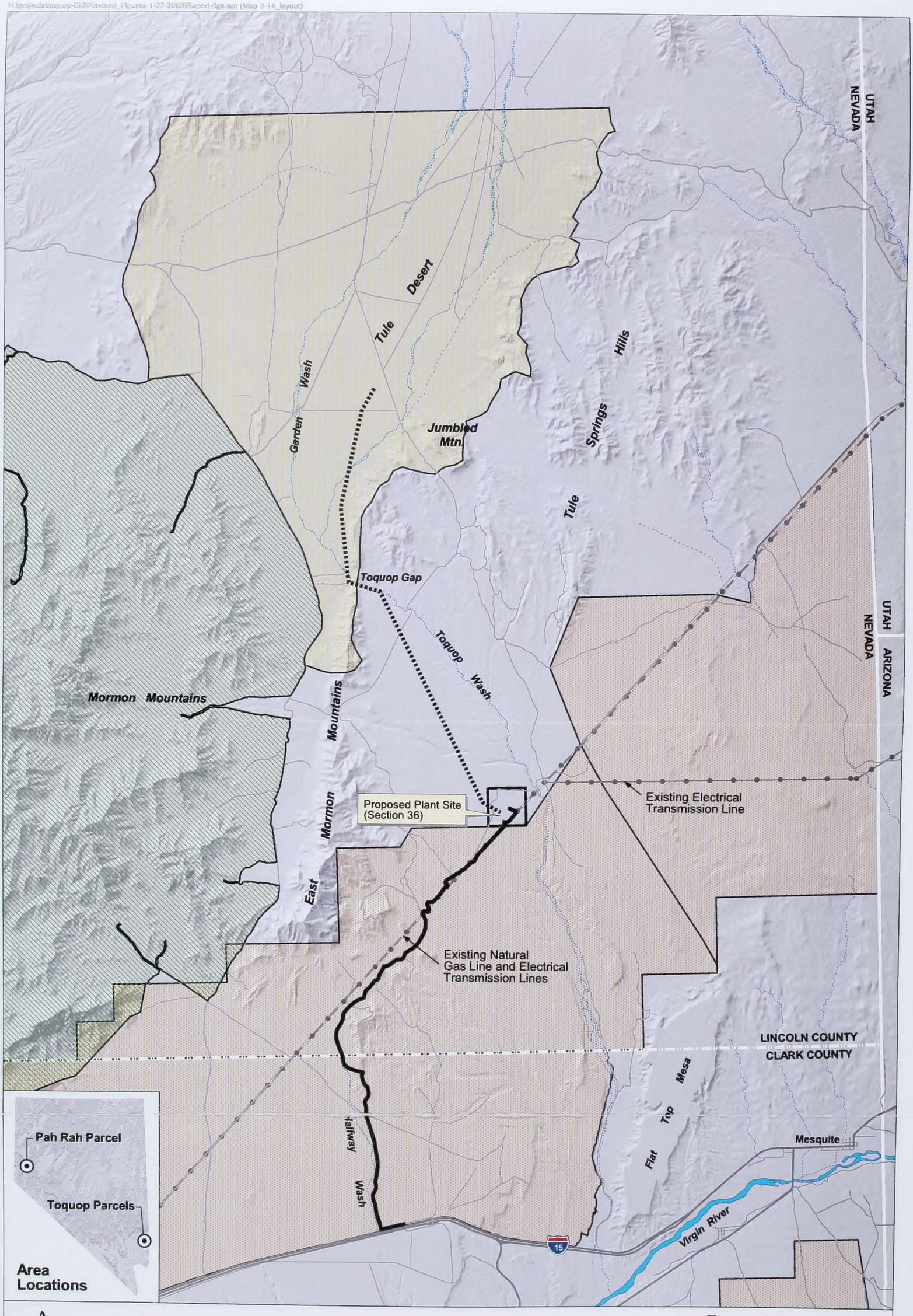
On October 2, 1968, Congress created the National Wild and Scenic Rivers System. The Wild and Scenic Rivers Act (P.L. 90-542, as amended) provided for a National Wild and Scenic Rivers System, designated the initial components of that system, and prescribed methods by which, and standards according to which, additional river components may be added to the system. Rivers are either authorized for listing as wild, scenic, or recreational by an Act of Congress or are designated by an act of the legislature of the state or states through which they flow. Nevada does not have any rivers that are listed pursuant to the National Wild and Scenic Rivers System (NPS, 2001a). As of 1998, no rivers in Nevada had been designated for study (NPS, 2001b).

3.10.2 Pah Rah Parcel

3.10.2.1 Wilderness Study Areas

No Wilderness Areas or WSAs exist near the Pah Rah parcel.

H:\projects\toquop-EIS\Revised_Figures\a-1-27-2003\Report-figs.apr (Map 3-14_layout)



Toquop Energy Project
Wilderness Study Areas and ACEC
Proposed Action and Alternative 3

(Proposed Action - Water Cooled
Alternative 3 - Air Cooled
All other features are the same)

Map 3-14

CH2MHILL

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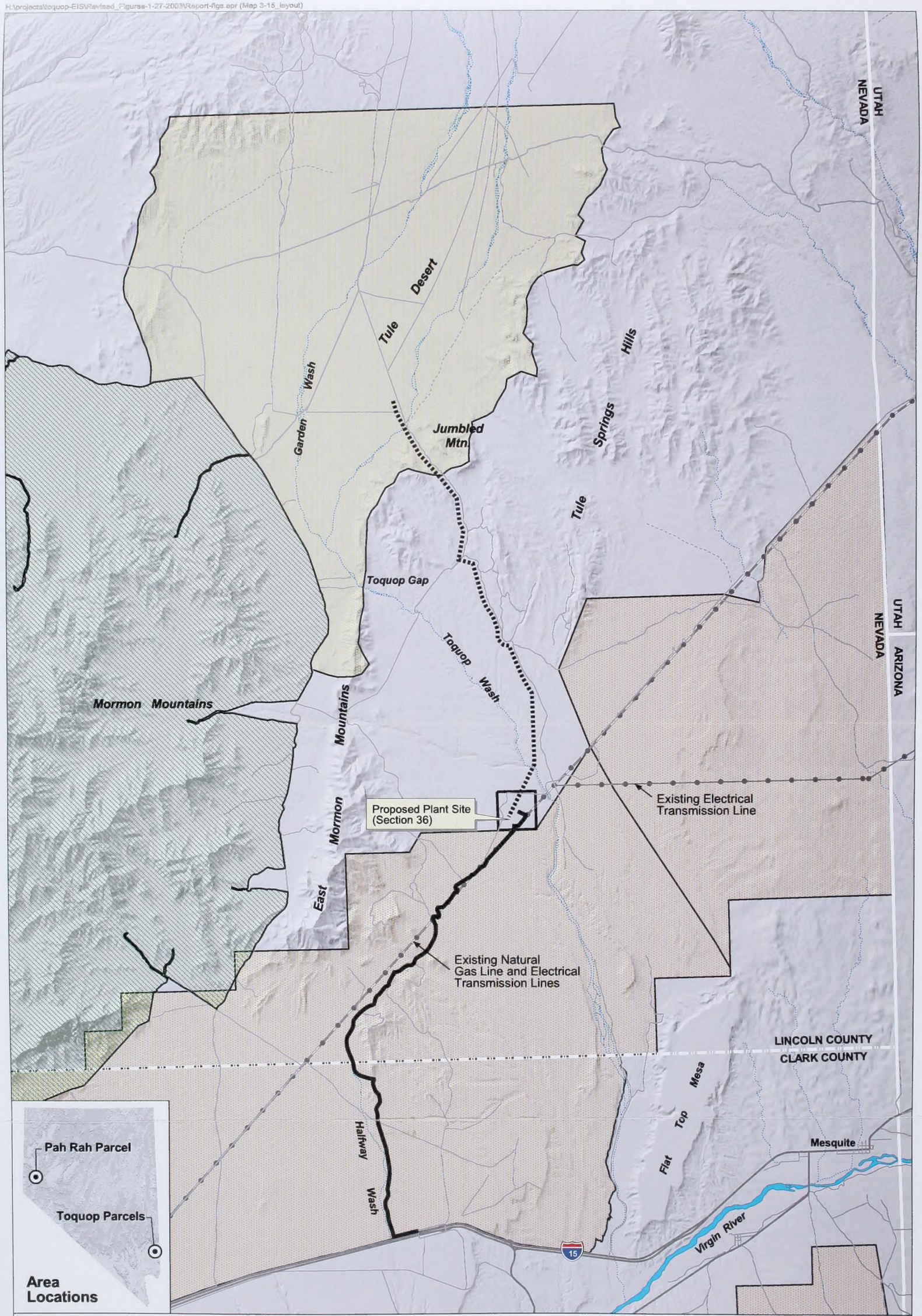

Toquop Energy Project
Wilderness Study Areas and ACEC
Alternative 1

Map 3-15

CH2MHILL

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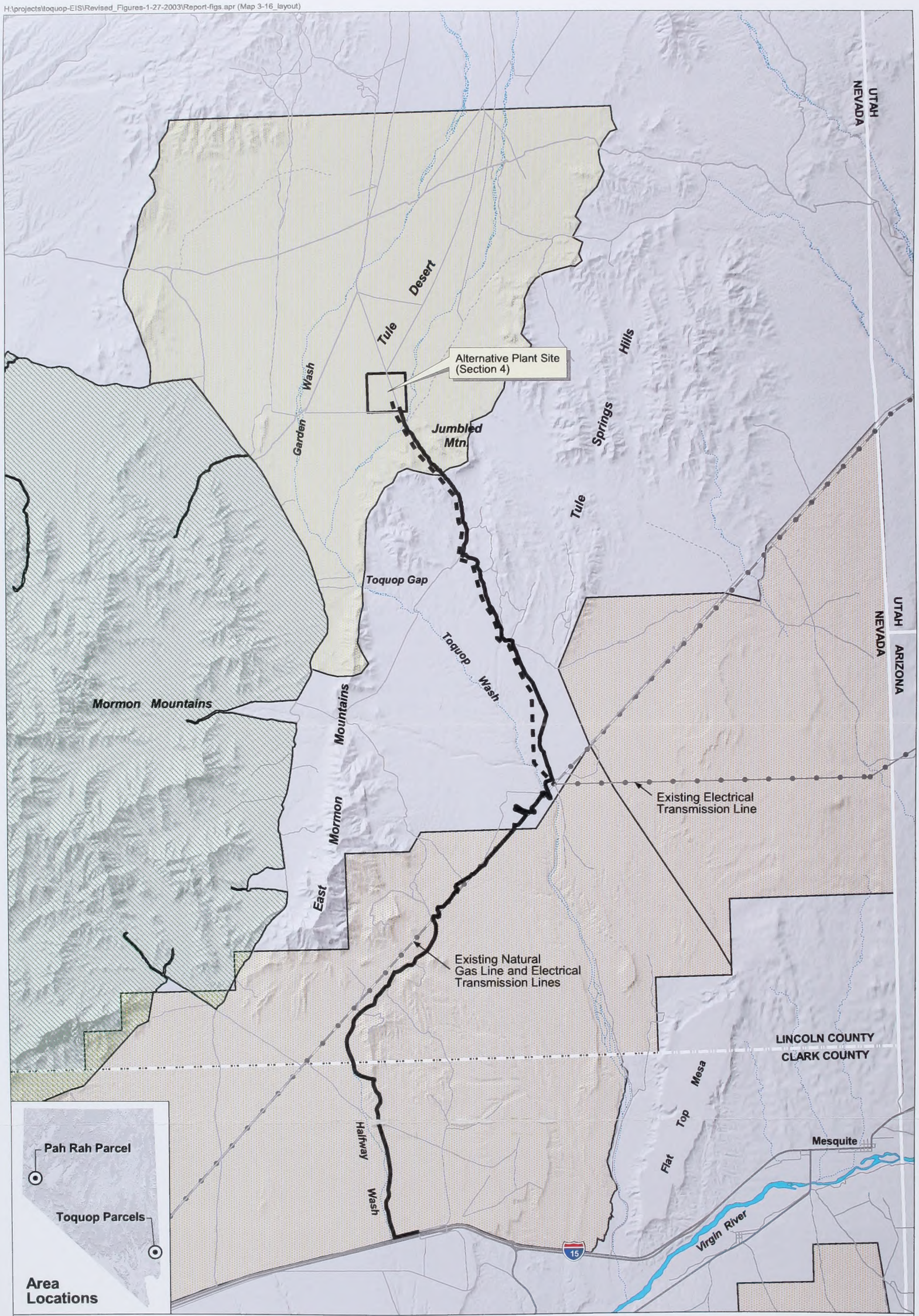


Toquop Energy Project
Wilderness Study Areas and ACEC
Alternative 2

Map 3-16

CH2MHILL

3.10.2.2 Areas of Critical Environmental Concern

The BLM Carson City Field Office Consolidated Resource Management Plan (CRMP) (BLM, 2001a) identified the following three ACECs within its planning area: the Incandescent Rocks Natural Scenic Area, the Steamboat Hot Springs Buckwheat Area, and the Stewart Valley Natural Research Area. The designation for the proposed Soda Lake ACEC was abandoned because of insufficient public lands. In 2001, the Southern Washoe County Urban Interface Plan Amendment identified the following three additional ACECs: the Carson Wandering Skipper Area, the Pah Rah High Basin (Dry Lakes) Petroglyph District, and the Virginia Range Williams Combleaf Habitat Area. The Pah Rah parcel is located approximately 9.5 miles east of the Pah Rah High Basin (Dry Lakes) Petroglyph District ACEC (BLM, 2001a).

3.10.2.3 Wild and Scenic Rivers

As discussed above, no rivers in Nevada are listed pursuant to the National Wild and Scenic Rivers System (NPS, 2001a), and, as of 1998, no rivers in Nevada had been designated for study (NPS, 2001b).

3.11 Wastes, Hazardous and Solid

This section discusses solid and hazardous wastes as they relate to the Proposed Action and the alternatives. Sites with known or suspected waste releases may be affected by a proposed project. Therefore, the Toquop area and Pah Rah parcel were evaluated to assess environmental conditions relative to the presence of solid or hazardous wastes. No solid or hazardous wastes are currently being generated within the Toquop area or the Pah Rah parcel, and no historic solid or hazardous waste sites were identified for these areas.

3.11.1 Toquop Area

A Phase I Environmental Site Assessment of the southern Toquop project area was prepared (Resource Concepts, Inc., 2001b). The investigation included the following activities:

- Review of ownership records and maps
- Review of site natural history
- Interviews with current owner's representative
- Review of federal, state, local, and additional environmental regulatory records
- Site reconnaissance

The southern Toquop parcel is currently uninhabited; development is limited to a series of dirt roads and five utility corridors (easements). The primary road generally follows the utility corridor. A secondary road departs from the utility corridor just southwest of the property, passes through the west and north portions of the parcel, and joins with the utility corridor road just outside of the northeast corner of the Toquop parcel. The utility easements that traverse the Toquop parcel include three transmission lines, a buried natural gas line, and a buried fiber optic cable. The Gourd Springs Mining District is located west and north of the Toquop parcel.

The environmental site assessment also included the results of a search of EPA's

Envirofacts database to determine whether the southern or northern Toquop parcels, or any properties within a 1-mile radius including utility corridors and the wellfield, have had chemical releases, water discharges, hazardous waste handling operations, or are sites with Superfund status. In addition, State records from the NDEP and local records from the Mesquite Fire and Rescue Department were reviewed. No issues of concern related to hazardous or solid waste were identified for the Toquop project area.

3.11.2 Pah Rah Parcel

A Phase I Environmental Site Assessment of the Pah Rah parcel was prepared (Resource Concepts, Inc., 2001c). The environmental site assessment included the same investigative activities as described for the Toquop area.

The Pah Rah parcel is APN 84-040-12, described as Section 9, T20N, R23E. The parcel is located atop a mesa at the southern end of the Pah Rah mountain range in Washoe County, Nevada. The parcel is uninhabited, with no development other than minor activity related to surveying. Virtually no improvements exist on the Pah Rah parcel other than survey markers. Small amounts of airborne litter were found at various locations on top of the mesa.

A transmission line corridor runs from the southwest to the northeast along the canyon west and north of the Pah Rah parcel. North of the parcel are a series of dirt roads, two transmission lines, and Olinghouse Mine. An old railroad grade extends between Wadsworth (east of the property) and Olinghouse Mine (northeast of the property). To the south, between the parcel and the Truckee River, are a buried pipeline, a transmission line, I-80, and a railroad corridor.

No issues of concern related to hazardous or solid waste were identified.

3.12 Cultural and Historical Resources and Native American Religious Concerns

3.12.1 Toquop Area

The Toquop area is in the Mojave Desert where humans have lived for approximately 12,000 years, mostly as mobile hunter-gatherers (Lyneis, 1982; Willeg and Aikens, 1988). Early Paleoindian groups focused more heavily on large game than later Archaic peoples who put greater emphasis on plant resources, as evidenced by an increasing profusion of, and sophistication in, ground-stone technology through time. The archaeological record indicates that over the past 8,000 years, increasing Archaic population density in the Great Basin pressured people into more restricted mobility, diverse diet breadth, and rigorous seasonal resource scheduling (Fowler and Madsen, 1986).

Virgin River and Muddy River Anasazi settlements, which developed approximately 300 A.D., broke from the strict hunter-gatherer lifeway typical of the rest of the Great Basin (Fowler and Madsen, 1986). These groups were more sedentary, living in pit-houses overlooking horticultural fields near the rivers. Still, use of surrounding lands, such as the Toquop Wash area, probably remained similar to that of earlier groups, even if less intensive. At approximately 1,000 to 1,200 years ago, a rapid population decline occurred in the area and, again, hunter-gatherer groups occupied the area.

Considerable debate exists as to the nature of this shift and whether it represents a simple change in settlement-subsistence pattern (a byproduct of climatic change), or replacement of Anasazi peoples by Numic-speaking groups expanding from the southeast California area (Fowler and Madsen, 1986; Madsen and Rhode, 1994). By the ethnographic present, the project area was inhabited by the Southern Paiute, but closely neighbors Mohave and Walapai lands to the south and Shoshone territory to the northwest.

The generally rugged terrain and lack of mineral resources has resulted in little historical use of the project vicinity (Sterner and Ezzo, 1996; White et al., 1991). Transportation has typically followed the more amenable landscape through the Virgin Valley, and mining interests have been limited to small-scale operations in surrounding areas. Mormon interest in the region began in the mid-nineteenth century, particularly in the Virgin River and Muddy River valleys where farming and ranching were possible. Springs, such as Abe Spring and Tule Spring located near the proposed eastern pipeline alignment, were used historically as watering holes for cattle.

Cultural resources work was conducted to comply with Federal law as required by the National Historic Preservation Act (NHPA) of 1966, as amended through 2000, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and the American Indian Religious Freedom Act (AIRFA) of 1978. Cultural resource permits required for the proposed project consist of a BLM Cultural Resource Use Permit, and a Nevada state curation agreement.

All cultural resources work was carried out according to the stipulations of a Programmatic Agreement (contained in *Appendix C, Cultural Resources Programmatic Agreement*) between the BLM, SHPO, and Toquop Energy for the Toquop Energy Project regarding the identification and treatment of historic properties. A Class III inventory, as defined in the BLM's (1990) cultural resource guidelines, was conducted for the linear portions of the Proposed Action and alternative project features to identify cultural resources. After prior consultation with, and concurrence of Nevada SHPO, Class II inventories were conducted for both the southern power plant site (for the Proposed Action, Alternative 1, and Alternative 3) and the northern alternative site (for Alternative 2). A Class I literature review and site files search was conducted for the wellfield area at the Harry Reid Center for Environmental Studies; specific well locations within this area will be inventoried at the Class III level once their final location and access routes are determined.

Thirty-four cultural resources sites and 10 isolated artifacts are known within the 1-mile study radius designated for review, although most are outside the ROWs. These are summarized in Table 3-5. Prehistoric sites include flaked stone scatters, roasting pits, rockshelters, and rock alignments in addition to isolated artifacts. Historic period sites include one pioneer burial, a telephone line, roads, and debris deposits, in addition to isolates. Some sites contain prehistoric and historic components. Thirty-six archaeological reports on previous work in the project vicinity were consulted during literature review. Further details regarding the sites and relevant literature will be contained in the pending stand-alone archaeological report, BLM report number NV-04-02-1376b.

TABLE 3-5
Archaeological Sites and Isolated Artifacts within 1 Mile of the Proposed Action and Alternatives

Category	NRHP* Eligible	Not NRHP Eligible
Prehistoric	7	19
Historic	3	2
Prehistoric/Historic	0	3
Isolate	0	10

*NRHP=National Register of Historic Places

Information relating to Native American concerns comes from two sources: existing ethnographic reports and data collection resulting from both the earlier land exchange proposal (the southern power plant site of the Proposed Action now incorporated as part of the Toquop Energy Project) and data collection done in relation to the Toquop Energy Project specifically. The BLM has initiated consultation with the following Paiute Indian Tribes: the Moapa Band of Paiutes (Nevada), the Paiute Indian Tribe of Utah, the Shivwits Band (Utah), the Las Vegas Paiute Tribe (Nevada), and the Kaibab Paiute Tribe (Arizona)—and informed one other tribal member as requested by the Paiute Indian Tribe of Utah of the proposed land exchange involving the Toquop parcel. The Moapa Band of Paiutes, Shivwits Band (Utah), and the Paiute Indian Tribe of Utah responded. The Las Vegas Paiute Tribe declined involvement, and no other responses were received. The responding tribes made on-site visits. All expressed concern that a property of traditional cultural or religious importance, the Salt Song Trail, might be affected, and the Moapa Band identified the trail as a sacred site. No "Indian plants" were mentioned or identified. Two tribes expressed concern for preservation of the archaeological resources. Subsequent data gathering has resulted in expressions of no concern for the Toquop Energy Project from both the Paiute Tribe of Utah and the Las Vegas Paiute Tribe. The Shivwits Band retains its concern for the preservation of all prehistoric archaeological resources; they indicated that its tribal members do not believe the Salt Song Trail extended into the project area after making a field visit to the area. Efforts continue to obtain information from the Moapa Band of Paiutes and from the Kaibab Paiute Tribe regarding the Toquop Energy Project.

Ethnographic information includes comments from Indian tribes and individuals (Stoffle et al., 1983) made in relation to construction of one of the existing electrical transmission lines that pass through the southern power plant site alternative. Various property types were established and then ranked by Indian participants as to their degree of concern for preservation of the property type. For example, trails were ranked ninth among eleven categories, although the level of concern was relatively high across all categories; the Salt Song Trail is not mentioned specifically by Stoffle et al. (1983).

Several geographic features were ranked by Indian participants as to their levels of concern; those relevant to the project area are the Toquop Wash, Tule Springs Hills,

Halfway Wash, Davidson Peak, and the East Mormon Mountains. Stoffle et al. (1983:91) state that "meanings" are attached to the named places, but those meanings are neither identified specifically nor amplified. One other place contained rockshelters, possibly other physical features, as well as various plants that were of concern to Native Americans (Stoffle et al., 1983:Tables 43, 44). Mitigation was suggested in several forms, including presence of a representative of the Moapa Band of Paiutes during groundbreaking activity, and consultation with Indian tribes concerning archaeological sites and "disposition of stands of Indian plants" (Stoffle et al., 1983:183).

No rockshelters or prehistoric or ethnohistoric archaeological sites were identified during the cultural resources inventory in this area of concern to Native Americans. No tribe has provided information as to a definite location of the Salt Song Trail relative to the Proposed Action or alternatives, or as to how religious practitioners would be affected by these actions. As noted previously, at least one tribe does not think the Salt Song Trail extends into the area of the Toquop Energy Project, and two others have expressed no concerns for the proposals.

3.12.2 Pah Rah Parcel

The general description of the cultural background for the Toquop area also applies to the Pah Rah parcel. However, by the ethnographic present, the Pah Rah parcel was within an area inhabited by the Northern Paiute, but closely neighbors traditional Washoe lands to the west.

The Pah Rah parcel is near the Truckee River and the Truckee Meadows, which were central to historic mining and logging transportation. A major east-west travelway leading west to nearby Reno, Nevada, has been in place since the mid-nineteenth century.

A Class II inventory, as defined in the State Protocol Agreement between the BLM and Nevada SHPO, was conducted for the Pah Rah parcel to identify cultural resources and assess cultural resource value. Consultation with Native American Tribes has been completed. The BLM consulted with the Pyramid Lake Paiute Tribe, the Washoe Tribe of Nevada and California, and the Reno-Sparks Indian Colony regarding the proposed land exchange and the Pah Rah parcel. No concerns were identified.

The Class II inventory and site file search identified several archaeological sites and a number of isolated artifacts or features (Table 3-6). Site types include rock features (most without associated artifacts) and an historic debris scatter. One site is NRHP eligible, while most are unevaluated. Most of these sites will require subsurface excavation to complete assessment, and one requires further consultation with appropriate Indian tribes to complete evaluation. One historic period site was determined not eligible due to its ambiguity of historic context. None of the isolates are eligible for inclusion to the NRHP. Eight cultural resources reports relevant to the parcel were reviewed.

TABLE 3-6
Archaeological Sites and Isolated Artifacts in the Pah Rah Parcel

Category	NRHP* Eligible	Not NRHP Eligible	Unevaluated
Prehistoric	1	0	5
Historic	0	1	0
Isolate	0	14	0

*NRHP=National Register of Historic Places

The one site on the offered (Pah Rah) parcel land was found eligible for the National Register of Historic Places based on its scientific research potential relating to issues such as upland settlement and subsistence practices. By comparison, archaeological features found on the federal land (Toquop southern parcel) have no clear function and had no associated artifacts—limiting the means to interpret them or to provide an age assessment. Similarly, sites in the federal parcel had no depth of cultural deposits that might have contained important scientific research potential.

The BLM initiated consultation with the Pyramid Lake Paiute Tribe, the Washoe Tribe of Nevada and California, and the Reno-Sparks Indian Colony regarding the Pah Rah parcel. Two tribes made trips and visual inspections without actually entering the parcel. The visit by the Washoe Tribe included a field inspection by a tribal elder that examined one of the archaeological sites and concluded it was likely a spiritual location used by a medicine person, although the age, function, and purpose are unknown. This site will be managed as an "unevaluated" cultural resource pending accumulation of additional information regarding NRHP eligibility, recent use, access, etc.

3.13 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in assets held in trust by the federal government for Indian Tribes or individuals. The Department of the Interior Order No. 3175 requires all its bureaus and offices to explicitly address anticipated effects on ITAs in planning, decision, and operation documents.

3.13.1 Toquop Area

According to surface land management status maps, Bureau of Indian Affairs (BIA), and BLM records, no Native American asset claims have been identified in the Toquop area.

3.13.2 Pah Rah Parcel

According to surface land management status maps and the BIA and BLM, no Native American asset claims have been identified on the Pah Rah parcel.

3.14 Environmental Justice

Title VI of the 1964 Civil Rights Act and Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, was signed on February 11, 1994. Federal agencies are required by

E.O. 12898 to address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The intent is that no person in the United States shall, on the basis of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.

The following sections discuss the population, per capita income, and breakdown of race descriptive for the Toquop area and the Pah Rah parcel. The counties considered for the Toquop area are Clark and Lincoln; the county considered for the Pah Rah parcel is Washoe.

3.14.1 Toquop Area

Table 3-7 presents demographic data for Clark and Lincoln counties. Per capita income in Clark County was $26,212. Per capita income in Lincoln County was $18,448. Clark County's poverty rate was 11.1 percent. Lincoln County's poverty rate was 14.8 percent.

Lincoln County contains eight census block groups. No census block groups in Lincoln County have low-income or minority communities (BLM, 1999). No low-income or minority communities exist on, adjacent to, or in the vicinity of the Toquop area.

3.14.2 Pah Rah Parcel

Table 3-7 also presents demographic data for Washoe County. Per capita income in Washoe County was $30,214. Washoe County's poverty rate was 9.8 percent. No low-income or minority populations exist on or adjacent to the Pah Rah parcel. Some residents of the Pyramid Lake Indian Reservation reside less than 5 miles east of the parcel in the Wadsworth area.

3.15 Paleontological Resources

3.15.1 Toquop Area

Local geologic maps and literature were assessed for the potential of paleontological resources in the Toquop area. According to the Lincoln County geologic maps, the project areas for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3 are within old alluvial gravels cemented together by calcium carbonate (Tschanz and Pampayan, 1970). The *Environmental Assessment for the Lincoln County Land Act of 2000* reported fossil-bearing strata east of the project area (also see Livingston, 2001), particularly in the Badland soil series. Badland soils occur along approximately 1.25 miles of the access road (Bagley et al., 1980). The Kern River 2003 Expansion Project reported significant fossils in Quaternary sediments and soils of the Muddy Creek Formation along the access road (Dames & Moore, 1990b and 1992). However, no paleontological resources were identified in a pedestrian survey of this area.

3.15.2 Pah Rah Parcel

Local geologic maps and literature were assessed for the potential of paleontological resources in the Pah Rah parcel. According to the Washoe County geologic maps, the Pah Rah Range consists of volcanic and non-marine sedimentary rocks. No paleontological resources are known to occur in the Pah Rah parcel.

TABLE 3-7
Demographic Data for Clark and Lincoln Counties

County	Total Population[a]	Per Capita Income[b]	Race (Percentage of Total Population)[a]
Clark County			
	1,375,765 in 1999	$26,212 in 1997	Caucasian (71)
			African American (9)
			American Indian (1)
			Asian (5)
			Native Hawaiian (1)
			Other Race (13)
Lincoln County			
	4,165 in 1999	$18,448 in 1997	Caucasian (91)
			African American (2)
			American Indian (2)
			Asian (1)
			Native Hawaiian (0)
			Other Race (4)
Washoe County			
	339,486 in 1999	$30,214 in 1997	Caucasian (80)
			African American (2)
			American Indian (2)
			Asian (4)
			Native Hawaiian (1)
			Other Race (11)
	Poverty Rate[b]		
	Clark County: 11.1% in 1997		
	Lincoln County: 14.8% in 1997		
	Washoe County: 9.8% in 1997		

Notes:

"American Indian" includes Alaska Native.
"Asian" includes Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, and Other Asian.
"Native Hawaiian" includes Native Hawaiian, Guamanian or Chamorro, Samoan, and Other Pacific Islander.
"Other Race" does not indicate the specific race.

Sources:

[a]http://factfinder.census.gov. Bureau of the Census, 2001 (1999 data).
[b]http://www.fedstats.gov (1997 data).

3.16 Socioeconomics

This section describes the existing social and economic conditions within Clark, Lincoln, and Washoe counties. These variables include employment, population, housing, and community infrastructure.

Clark and Lincoln counties comprise the region of influence for potential economic impacts. This two-county area was determined to be the impact region because the proposed project features would be located in Lincoln County, but the project construction and operation workforce could be expected to come from Clark and Lincoln counties. Therefore, economic effects resulting from the project would likely primarily occur in these counties. Effects could occur to other surrounding counties, or counties in other regions of the United States, depending on where project facility components are manufactured. These effects are impossible to determine. For that reason, this analysis is limited to Clark and Lincoln counties. Economic impacts on Washoe County are discussed qualitatively because no facilities are proposed for development on the Pah Rah parcel.

Because of the nature of the Proposed Action and the remoteness of the project sites, the area of influence for community infrastructure is limited to the project sites, the proposed utility alignments, and the immediately adjacent lands.

3.16.1 Toquop Area

3.16.1.1 Population

Clark County is the most populous of the 17 counties in Nevada with an estimated total population of 1,425,723 in 2000. During this year, Clark County accounted for about 69 percent of the total state population of 2,066,831. The five incorporated cities in the county: Boulder City, Henderson, Las Vegas, Mesquite and North Las Vegas comprise almost 60 percent of the county's 2000 population. The City of Mesquite, the incorporated city in Clark County that is closest to the project site, had a population estimate at 15,605 in 2000. In 1990, the Clark County population was estimated to be 770,280 (Nevada State Demographer's Office, 2001). The total increase in population during the 10-year period from 1990 to 2000 was approximately 58 percent, with an average annual growth rate of 6.3 percent. The Nevada State Demographer's Office predicts this annual rate of growth will decrease substantially during the period of 1999 to 2010 to an average rate of 2.8 percent (Nevada State Demographer's Office, 2000). In-migration by retirees and those seeking employment in the services sector of the economy continues to be the primary influence on Clark County population growth.

Lincoln County is rural and sparsely populated. In 2000, the estimated population was 4,420 (up 16 percent from the 1990 population estimate of 3,810). This represents an average annual growth rate of 1.5 percent. The State Demographer's Office predicts this average annual growth rate will decline to 0.1 percent during the period of 1999 to 2010. Lincoln County has just one incorporated city, Caliente, with a 2000 population of 1,132. The three unincorporated towns, Alamo, Panaca and Pioche had a total 2000 population of 2,040. Combined, these three towns and the City of Caliente made up about 70 percent of the County population in 2000 (Nevada State Demographer's Office, 2000 and 2001). Out-migration of

young people seeking education and employment, and in-migration of retirees are the primary factors shaping Lincoln County population trends.

3.16.1.2 Employment

The Bureau of Economic Analysis (BEA), Regional Economic Information System (REIS) reported a Clark County employment of 815,718 for the year 1999. Table 3-8 lists Clark County employment by industry, along with percentages of total employment. The services industry (which includes hotels, gaming, tourism entertainment, and recreation) accounts for 44 percent of the county employment. Retail trade is the next most important industry in terms of employment accounting for 16 percent of county's jobs.

Table 3-9 shows the 1999 employment estimates for Lincoln County as reported by the BEA REIS. The government and government enterprises account for 30 percent of the total county employment with retail trade accounting for another 16 percent of the total employment.

TABLE 3-8
1999 Clark County Total Full- and Part-Time Employment by Industry

	Jobs	% of Total
County Total	**815,718**	**100.0%**
Farm employment	**338**	**<0.1%**
Non-farm employment	**815,380**	**100.0%**
Ag. serv., forestry, fishing, and other	8,572	1.1%
Mining	1,467	0.2%
Construction	77,558	9.5%
Manufacturing	21,586	2.6%
Transportation and public utilities	39,924	4.9%
Wholesale trade	24,311	3.0%
Retail trade	131,648	16.1%
Finance, insurance, and real estate	72,149	8.8%
Services	362,463	44.4%
Government and government enterprises	75,702	9.3%
Federal, civilian	8,607	1.1%
Military	9,068	1.1%
State and local	58,027	7.1%
State	11,578	1.4%
Local	46,449	5.7%

Source: BEA REIS, 2002

TABLE 3-9
1999 Lincoln County Total Full- and Part-Time Employment by Industry

	Jobs	% of Total
County Total	**2,000**	**100.0%**
Farm employment	**149**	**7.5%**
Non-farm employment	**1,851[1]**	**92.5%**
Ag. serv., forestry, fishing, and other	D	
Mining	37	1.9%
Construction	44	2.2%
Manufacturing	D	
Transportation and public utilities	62	3.1%
Wholesale trade	D	
Retail trade	319	16.0%
Finance, insurance, and real estate	92	4.6%
Services	D	
Government and government enterprises	607[1]	30.4%
Federal, civilian	35	1.8%
Military	L	
State and local	564	28.2%
State	155	7.8%
Local	409	20.5%

Source: BEA REIS, 2002
D = Estimate not shown to avoid disclosure of confidential information; estimate included in non-farm total
L = Estimate less than $50,000 or less than 10 jobs; estimate included in non-farm total
[1] Totals for categories are greater than the sum of the individual items because of data not provided for confidentiality reasons. However, as stated above for "D," the non-farm total includes the confidential number which accounts for the discrepancies in numbers presented. This is also the case for the government category.

3.16.1.3 Unemployment

Between 1990 and 2001, the average annual unemployment rate in Clark County has ranged from a high of 7.1 percent in 1993 to a low of 4.0 percent in 1997. In 2001, the average annual unemployment rate was 5.5 percent. In general, the Clark County unemployment rate for the period of 1990 to 2001 has been slightly lower than the state averages, which had a range of 4.1 percent in 1997 and a high of 7.2 in 1993 (Nevada Department of Employment, Training and Rehabilitation, 2002).

For Lincoln County, the unemployment rate is generally higher than the state average. During the period between 1990 and 2001, Lincoln County had a maximum unemployment rate of 11.9 percent in 1995 and a low of 6.1 percent in 1999. In

2001, the average annual unemployment rate was 7.2 percent (Nevada Department of Employment, Training and Rehabilitation, 2002).

3.16.1.4 Earnings and Income

Per capita income in Clark County in 1989 was $15,109 (Bureau of the Census, 1991); in 1997, it was $26,212. Total personal income in Clark County in 1997 was $29,013,523,000 (FedStats, 2001). Table 3-10 shows the place of work earnings by industry for the year 1999 as reported by the BEA REIS. The services industry accounts for 42 percent of the county earnings, followed by government and government services with about 13 percent, and the construction industry with about 12 percent of the place of work earnings.

Per capita income in Lincoln County in 1989 was $9,074 (Bureau of the Census, 1991); in 1997, it was $18,448. Total personal income in Lincoln County in 1997 was $76,227,000 (FedStats, 2001).

Table 3-11 shows the Lincoln County place of work earnings by industry for the year 1999 as reported by the BEA REIS. The government and government services industry accounts for almost 40 percent of the County earnings.

TABLE 3-10
1999 Clark County Place of Work Earnings by Industry

	Place of Work Earnings ($1,000)	% of Total
County Total	**28,047,163**	**100.0%**
Farm Earnings	**7,841**	**0.0%**
Non-farm Earnings	**28,039,322**	**100.0%**
Ag. Serv., forestry, fishing, and other	193,404	0.7%
Mining	40,005	0.1%
Construction	3,347,301	11.9%
Manufacturing	826,733	2.9%
Transportation and public utilities	1,592,680	5.7%
Wholesale trade	1,034,457	3.7%
Retail trade	2,778,812	9.9%
Finance, insurance, and real estate	2,707,802	9.7%
Services	11,902,591	42.4%
Government and government enterprises	3,615,537	12.9%
Federal, civilian	552,532	2.0%
Military	367,317	1.3%

TABLE 3-10
1999 Clark County Place of Work Earnings by Industry

	Place of Work Earnings ($1,000)	% of Total
State and local	2,695,688	9.6%
State	475,180	1.7%
Local	2,220,508	7.9%

Source: BEA REIS, 2002

TABLE 3-11
1999 Lincoln County Place of Work Earnings by Industry

	Place of Work Earnings ($1,000)	% of Total
County Total	**58,616**	**100.0%**
Farm Earnings	**564**	**1.0%**
Non-farm Earnings	**58,052[1]**	**99.0%**
Ag. serv., forestry, fishing, and other	D	
Mining	938	1.6%
Construction	858	1.5%
Manufacturing	D	
Transportation and public utilities	3,138	5.4%
Wholesale trade	D	
Retail trade	3,649	6.2%
Finance, insurance, and real estate	1,210	2.1%
Services	D	
Government and government enterprises	22,974	39.2%
Federal, civilian	1,809	3.1%
Military	112	0.2%
State and local	21,053	35.9%
State	7,896	13.5%
Local	13,157	22.4%

Source: BEA REIS, 2002
D = Estimate not shown to avoid disclosure of confidential information; estimate included in non-farm total
[1] Totals for categories are greater than the sum of the individual items because of data not provided for confidentiality reasons. However, as stated above for "D," the non-farm total includes the confidential number which accounts for the discrepancies in numbers presented.

3.16.1.5 Tax Receipts

Clark County's fiscal year (FY) 1999-2000 taxable sales were $21.2 billion. Based on a sales and use tax rate of 7.25 percent, the estimated sales tax generated in FY 1999-2000 was $1.5 billion (Nevada Department of Taxation, 2001). The total assessed value of property in the county (35 percent of the taxable value) for FY 1999-2000 was $30.5 billion. Projected property tax revenue for the county was $906.2 million, resulting in an average property tax rate of 2.967 percent (Nevada Department of Taxation, 1999).

Lincoln County's FY 1999-2000 taxable sales were $25.2 million. Based on a sales and use tax rate of 6.75 percent, the estimated sales tax generated in FY 1999-2000 was $1.7 million (Nevada Department of Taxation, 2001). The total assessed value of Lincoln County properties was $82.6 million in FY 1999-2000. Projected property tax revenue for the county was $2.3 million, resulting in an average property tax rate of 2.832 percent (Nevada Department of Taxation, 1999).

3.16.1.6 Housing

The 2000 Census reports that the total number of housing units in Clark County was 559,799. Of this total, 512,253 units were occupied, with a corresponding vacancy rate of 8.5 percent. The percentage of owner-occupied units was 59.1; the percentage of renter-occupied units was 40.9. The average household size was 2.65 persons (Bureau of the Census, 2001).

The 2000 Census reports that the total number of housing units in Lincoln County was 2,178. Of this total, 1,540 units were occupied, with a corresponding vacancy rate of 29.3 percent. The percentage of owner-occupied units was 75.1; the percentage of renter-occupied units was 24.9. The average household size was 2.48 persons (Bureau of the Census, 2001).

The nearest residential communities are the cities of Mesquite in Clark County, approximately 12 miles from the southern Toquop site, and Caliente in Lincoln County. This is the only incorporated city in Lincoln County and is approximately 50 miles north of the southern Toquop site—although driving distance to Caliente from the project site is approximately 170 miles.

3.16.1.7 Community Infrastructure

3.16.1.7.1 Education. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No schools are located in the project area. The nearest schools are in Mesquite.

3.16.1.7.2 Police Protection. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No police protection facilities are located in the project area. BLM enforcement has one officer assigned to this area.

The Lincoln County Sheriff's Department provides law enforcement services to Lincoln County, including the Toquop area. The department has 16 personnel, 10 of which are patrol deputies. Two sheriff stations, one in Alamo and the other in Pioche, are located in the county. The response time to the Toquop area from the Pioche station is approximately 2 hours (Bradfield, 2001). The nearest law

enforcement center is Mesquite in Clark County.

3.16.1.7.3 Fire Protection. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No fire protection facilities are located in the project area.

The nearest fire station to the Toquop area is in Mesquite. Lincoln County has four fire fighting stations, each with an engine and ambulance. The stations are located in Alamo, Caliente, Panaca, and Pioche. All four stations are manned by volunteer firefighters. The dispatch for the four stations is handled through the sheriff's department in Pioche. The Lincoln County station nearest the Toquop area is in Alamo, and the response time to the area is approximately 2 hours (Bradfield, 2001). BLM has a fire fighting station in Caliente and an agreement with the Las Vegas BLM office that would allow the fire station in Mesquite to respond to wildfires in southern Lincoln County. The Mesquite station would have an approximate 30-minute response time, utilizing Type 3 engines.

3.16.1.7.4 Hospitals and Medical Care. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No medical facilities are located in the project area. The 137-bed Dixie Regional Medical Center is in St. George, Utah, approximately 35 miles east of Mesquite. The Grover C. Dils Hospital, a 20-bed facility owned by Lincoln County, is in Caliente approximately 50 miles north of the southern Toquop site—although driving distance to Caliente from the project site is approximately 170 miles.

3.16.1.7.5 Water and Wastewater. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No municipal or industrial water or wastewater facilities are located in the project area.

3.16.1.7.6 Natural Gas. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. The 36-inch Kern River Gas Pipeline crosses the southeast corner of the southern Toquop parcel.

3.16.1.7.7 Telephone. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. The Touch America, Inc. (Williams Communications) fiber optic communication cable crosses the southeast corner of the southern Toquop parcel along the southeast side of the natural gas line. No telephone facilities are located in the project area. The Toquop area is in the service area of Lincoln County Telephone.

3.16.1.7.8 Electricity. The northern Toquop parcel is undeveloped. Three overhead electric transmission lines cross the southern Toquop parcel. Easements are granted for one transmission line to the Bureau of Reclamation, City of Los Angeles, and Nevada Power Company. A second transmission line is owned by the Intermountain Power Project. The third transmission line is owned by Nevada Power Company (Resource Concepts, Inc., 2001a). The Toquop area is in the service area of the Lincoln County Power District.

3.16.2 Pah Rah Parcel

3.16.2.1 Population

Although Southern Washoe County contains the urbanized Reno Metropolitan Statistical Area (MSA), the majority of the county's land area is sparsely settled and rural in character. The County is the second most populated (behind Clark County) with a 2000 population estimate of 333,566. This represents nearly a 30 percent increase from the 1990 population of 257,120, resulting in an annual average growth rate of 2.6 percent. The State Demographer's office predicts the county's growth rate will slow to 1.7 percent per year for the period between 1999 and 2010. The incorporated cities of Reno and Sparks account for almost 75 percent of the county population.

3.16.2.2 Employment

The BEA REIS reported a Washoe County employment of 231,950 for the year 1999. Table 3-12 lists Washoe County employment by industry along with percentages of total employment. The services industry (which includes hotels, gaming, tourism entertainment, and recreation) accounts for 40 percent of the county employment. Retail trade is the next most important industry in terms of employment accounting for 15 percent of the county jobs.

TABLE 3-12
1999 Washoe County Employment by Industry

	Total Full- and Part-Time Employment (jobs)	% of Total
County Total	**231,950**	**100.0%**
Farm employment	**686**	**0.3%**
Non-farm employment	**231,264**	**99.7%**
Ag. serv., forestry, fishing, and other	2,000	0.9%
Mining	891	0.4%
Construction	17,063	7.4%
Manufacturing	14,151	6.1%
Transportation and public utilities	13,290	5.7%
Wholesale trade	12,888	5.6%
Retail trade	35,903	15.5%
Finance, insurance, and real estate	21,314	9.2%
Services	91,385	39.4%
Government and government enterprises	22,379	9.6%
Federal, civilian	3,156	1.4%
Military	676	0.3%
State and local	18,547	8.0%
State	6,053	2.6%
Local	12,494	5.4%

Source: BEA REIS, 2002

3.16.2.3 Unemployment

Between 1990 and 2001, the average annual unemployment rate in the Reno MSA (Washoe County) has ranged from a high of 6.5 percent in 1993 to a low of 3.0 percent in 2000. In 2001, the average annual unemployment rate was 5.5 percent. In general, the Reno MSA unemployment rate for this period has been about 0.5 percent lower than the State average, which had a range of 4.1 percent in 1997 and a high of 7.2 percent in 1993 (Nevada Department of Employment, Training and Rehabilitation, 2002).

The annual average unemployment rate in Washoe County in 1991 was 5.0 percent; in 2000, it was 3.0 percent. In 2001, the average rate through August was 3.9 percent (Bureau of Labor Statistics, 2001).

3.16.2.4 Earnings and Income

Per capita income in Washoe County in 1989 was $16,365 (Bureau of the Census, 1991); in 1997, it was $30,214. Total personal income in Washoe County in 1997 was $9,261,636,000 (FedStats, 2001). Table 3-13 shows the place of work earnings by industry for the year 1999 as reported by the BEA REIS. The services industry accounts for 36 percent of the county earnings, followed by government and government services with about 14 percent, and retail trade with about 10 percent of the total county place of work earnings.

TABLE 3-13
1999 Washoe County Place of Work Earning by Industry

	Place of Work Earnings ($1,000)	% of Total
County Total	7,852,487	100.0%
Farm employment	2,582	0.0%
Non-farm employment	7,849,905	100.0%
Ag. serv., forestry, fishing, and other	40,568	0.5%
Mining	49,710	0.6%
Construction	734,145	9.3%
Manufacturing	605,655	7.7%
Transportation and public utilities	585,288	7.5%
Wholesale trade	547,560	7.0%
Retail trade	766,609	9.8%
Finance, insurance, and real estate	593,710	7.6%
Services	2,821,548	35.9%
Government and government enterprises	1,105,112	14.1%
Federal, civilian	206,104	2.6%
Military	10,574	0.1%
State and local	888,434	11.3%
State	338,796	4.3%
Local	549,638	7.0%

Source: BEA REIS, 2002

3.16.2.5 Tax Receipts

Washoe County's budget is $455 million, of which approximately 50 percent is referred to as the general fund. Almost 80 percent of the general fund is from sales tax (41 percent) and property tax (38 percent) revenues (Washoe County, 2001).

3.16.2.6 Housing

The 2000 Census indicates that the total number of housing units in Washoe County was 143,908. Of this total, 132,084 units were occupied, with a corresponding vacancy rate of 8.2 percent. The percentage of owner-occupied units was 59.3; the percentage of renter-occupied units was 40.7. The average household size was 2.53 persons (Bureau of the Census, 2001).

3.16.2.7 Community Infrastructure

The Pah Rah parcel is undeveloped land. There are no schools, police protection facilities, medical facilities, water or wastewater facilities, natural gas facilities, telephone facilities, electricity generation, or transmission facilities on the project site. Two overhead 345-kV electric transmission lines are located north of the Pah Rah parcel. An overhead 60-kV electric transmission line and a gas transmission pipeline are located south of the parcel.

3.17 Transportation

This section discusses existing roadways in the Toquop area and Pah Rah parcel.

3.17.1 Toquop Area

Interstate 15 (I-15) is the only major roadway in the vicinity of the southern Toquop parcel. It is the main north-south route connecting Las Vegas, Nevada, and Salt Lake City, Utah. I-15 is approximately 11 miles south of the southern parcel. In this area, the interstate freeway is aligned southwest-northeast. Access to both the southern and northern Toquop parcels is from I-15 via the East Mesa Interchange (Exit 109) approximately 9 miles west of Mesquite, Nevada. Exit 109 is a truck rest area—a paved area without facilities that can be accessed directly from eastbound and westbound I-15.

The existing freeway exit leaves westbound I-15 directly on the north side and travels west for approximately 0.6 mile parallel to I-15 on a lightly paved two-lane road. The exit from eastbound I-15 doubles back to the west for approximately 0.6 mile parallel to and south of I-15 on another lightly paved two-lane road. The latter road then crosses under I-15 at 90 degrees through two single-lane concrete underpasses where it intersects the former road and continues west parallel to I-15 for another 0.5 mile on the north side of the freeway. The distance to the southern Toquop parcel from I-15 is 14.4 miles. The northern plant site is approximately 12 miles farther along the same road.

The access road from I-15 to the northern power plant site is in good condition except for the 8 miles between a turn-off that leads to communications towers and northern side of Toquop Wash. The section from the towers through the Toquop Wash is two-track, has many sharp turns, and requires slow speeds.

The roadway characteristics of I-15 in the vicinity of the two Toquop parcels consist of a paved divided freeway with paved shoulders, two lanes in each direction, a "good" roadway condition, and a posted speed limit of 75 mph.

Table 3-14 lists the existing and projected (year 2003) average daily traffic volume for I-15 near the East Mesa Interchange (Exit 109) and for the East Mesa Interchange offramp.

3.17.2 Pah Rah Parcel

Interstate 80 (I-80) is the major roadway in the vicinity of the Pah Rah parcel. It is an east-west route and is approximately 1.25 miles south of the parcel. The roadway characteristics of I-80 in the vicinity of the Pah Rah parcel consist of a paved divided freeway with paved shoulders, two lanes in each direction, a "good" roadway condition, and a posted speed limit of 70 mph.

Access to the Pah Rah parcel can occur from two locations. From the south, exit I-80 at the Derby Dam exit (Exit 36); on the north side of the freeway is an unpaved pull-out area. The parcel is approximately 1.5 miles northeast of this location. The site can be accessed on foot and is a steep climb.

Access to the Pah Rah parcel from the north is accomplished by exiting at either of two exits from I-80 at State Route (S.R.) 447 on either side of Wadsworth, Nevada. S.R. 447 is a northwest-southeast trending two-lane paved road after passing through Wadsworth. Turn west onto Olinghouse Road from S.R. 447 at approximately 3.8 miles north of I-80. Travel west approximately 4.3 miles along the graded Olinghouse Road to the

TABLE 3-14
Existing and Estimated Average Daily Traffic Volumes on I-15 near the Project Area

Roadway	Average Daily Vehicle Traffic (ADT)	Average Daily Truck Traffic (ADTT)[b]
I-15 near the East Mesa Interchange (2000)	15,800[a]	1,580
Eastbound	7,900[a]	790
Westbound	7,900[a]	790
I-15 near the East Mesa Interchange (2003 estimated)	18,818[c]	1,882
Eastbound	9,409[c]	941
Westbound	9,409[c]	941
East Mesa Interchange offramp (2000)	680[a]	68
Eastbound	280[a]	28
Westbound	400[a]	40
East Mesa Interchange offramp (2003 estimated)	810[c]	81
Eastbound	330[c]	33
Westbound	480[c]	48

[a] Source: Leegard (2001).
[b] Estimated at 10 percent of ADT.
[c] Calculated at 6 percent annual growth rate, based on historical traffic records.

transmission line road. Turn south on an ungraded road, cross an ephemeral creek, and keep right at 0.3 mile, proceeding southeast along the transmission line access road for an additional 1.6 miles. The site can be accessed on foot, and, depending on location, can be a steep climb.

Chapter 4
Environmental Consequences

Chapter 4.0 Environmental Consequences

4.1 Introduction

This chapter describes the environmental consequences that would result from the adoption of this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*; exchanging either of the Toquop parcels for the Pah Rah parcel; and the construction, operation, and maintenance of the Toquop Energy Project. Effects of implementing the No Action Alternative also are described. The impact analysis focuses on potential direct, indirect, total, and cumulative impacts on the project area resources that were described in *Chapter 3, Affected Environment.* Mitigation measures are identified that would avoid, reduce, rectify, or compensate for certain adverse impacts. The final sections of this chapter describe unavoidable adverse impacts, short-term uses of the environment and long-term productivity, the irreversible and irretrievable commitments of resources, and energy requirements and conservation potential.

4.1.1 Assumptions and Assessment Guidelines

Assumptions and assessment guidelines for specific resource areas are summarized in the appropriate resource topics in this chapter. Common assumptions that were followed during the preparation of this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* are the following:

- Project features were designed only to the feasibility level, which represents reasonable approximations for assessing potential project impacts and recommending appropriate mitigation measures.
- The expected life of the project is approximately 42 years (26-month construction period and 40-year operation period).
- The design of the Tule Desert wellfield and associated pipelines would only have sufficient capacity to supply the Toquop Energy Project.
- Environmental resource data have been developed and analyzed to the level of detail necessary to understand potential impacts and to distinguish project effects (both beneficial and adverse) among the Proposed Action and alternatives.
- Ground water data developed for this study are the best available representation of current and predicted conditions.
- Construction workers would be hired primarily from the local labor force in the Clark/Lincoln County area and most of those would commute from Las Vegas.
- Measures described in *Appendix A, Measures for Protecting Desert Tortoises and Their Habitat, Appendix B, Standard Construction and Operation Procedures, and Appendix C, Cultural Resources Programmatic Agreement,* are an integral part of the Proposed Action and Alternatives 1, 2, and 3.

- Mitigation measures would be implemented concurrent with the construction of project features.

- A Plan of Development (POD) will be finalized that details the construction of the power plant, access road, and ancillary facilities, and that incorporates site-specific stipulations, terms, and conditions associated with lands administered by the Ely and Las Vegas Field Offices of the BLM where project features would be located.

- Cumulative impacts consist of the potential impacts of the Proposed Action, Alternative 1, Alternative 2, or Alternative 3 for the Toquop Energy Project plus the potential impacts of the past, present, and reasonably foreseeable projects identified in *Chapter 1, Section 1.8, Interrelated Projects*. Only those projects that meet the criteria listed in *Section 1.8* and discussed in *Section 4.18, Cumulative Impacts*, are assessed for potential cumulative impacts.

4.1.2 Incomplete and/or Unavailable Information

The Code of Federal Regulations at 43 CFR 1502.22 mandates that agencies evaluating reasonably foreseeable significant adverse effects on the human environment in an EIS must identify potentially incomplete or unavailable information.

During the preparation of this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project,* information was incomplete and/or unavailable in three principal areas associated with the assessment of environmental consequences to ground water resources:

- The amount and movement of ground water in the basin-fill deposits within the Tule Desert.

- The amount and movement of ground water in the fractured-rock aquifer underlying both the Tule Desert and the Virgin River Valley hydrographic areas.

- The location(s) and amount(s) of ground water recharge and discharge from the fractured-rock aquifer underlying the Tule Desert.

Incomplete or unavailable information is discussed in detail in Section 4.4.1, *Groundwater Resources—Incomplete and/or Unavailable Information.*

4.1.3 Option for BLM to Issue ROWs

Under the Proposed Action, Alternative 1, Alternative 2, or Alternative 3, BLM could, in lieu of or in advance of the land disposal for the Toquop parcel, issue a ROW for the power plant site. The only additional effects on project area resources that would result from implementation of the Toquop Energy Project through a series of ROWs rather than a land disposal (that is, lower tax receipts) are described in *Section 4.16.5, Socioeconomics.*

4.2 Soils and Geology

This analysis addresses the potential soil constraints during project construction in the Toquop area. Because no impacts on soils are expected during project operation, that issue is not addressed further. This analysis also addresses the potential geologic constraints during

construction in the Toquop area. Because no impacts on geology are expected during project operation, that issue is not addressed further.

4.2.1 Soils

4.2.1.1 Proposed Action

4.2.1.1.1 Impacts

Toquop Area. An estimated 449 acres of soils would be disturbed and/or included in construction rights-of-way under the Proposed Action. Of this total, 267 acres would be reclaimed and 182 acres used for project features. Biological soil crusts present at the power plant site and along the proposed water pipeline corridor would be disturbed and some would be lost. However, the project has been designed to minimize the acreage of soils disturbed, and disturbed areas will be reclaimed. Soils disturbed during project construction activities may result in a temporary increase in erosion and wind-blown dust until construction is completed. After the BMPs and SOPs are implemented, no impact would result. Also, paving the access road may increase the potential for localized runoff and erosion. Improved access to the area via this road may result in greater off-highway vehicle (OHV) use and resultant impacts to soils.

Pah Rah Parcel. No construction activities would be associated with the proposed land exchange. The proposed land exchange in Washoe County (Pah Rah parcel) would not alter existing onsite soils and would not result in impacts to those soils.

4.2.1.1.2 Mitigation. No mitigation is required.

4.2.1.2 Alternative 1

4.2.1.2.1 Impacts. Impacts associated with Alternative 1 would be similar to those described for the Proposed Action. An estimated 451 acres of soils, including some biological soil crusts, would be disturbed under this alternative. Of this, 269 acres would be reclaimed and 182 acres used for project features.

4.2.1.2.2 Mitigation. No mitigation is required.

4.2.1.3 Alternative 2

4.2.1.3.1 Impacts. Impacts associated with Alternative 2 would be similar to those described for the Proposed Action. An estimated 581 acres of soils, including some biological soil crusts, would be disturbed under this alternative. Of this, 344 acres would be reclaimed and 237 acres used for project features.

4.2.1.3.2 Mitigation. No mitigation is required.

4.2.1.4 Alternative 3

4.2.1.4.1 Impacts. Impacts associated with Alternative 3 would be similar to those described for the Proposed Action. An estimated 417 acres of soils, including some biological soil crusts, would be disturbed under this alternative. Of this, 267 acres would be reclaimed and 150 acres used for project features.

4.2.1.4.2 Mitigation. No mitigation is required.

4.2.1.5 No Action Alternative

Implementation of the No Action Alternative would result in no change to

the Toquop area and Pah Rah parcel. Trends and future conditions in the Toquop area and Pah Rah parcel under the No Action Alternative are expected to be the same as existing conditions described in Chapter 3. Therefore, no soils impacts in the Toquop area and on the Pah Rah parcel would be expected.

4.2.2 Geology

4.2.2.1 Proposed Action

4.2.2.1.1 Impacts

Toquop Area. No geologic features or resources within the project area would be affected by the Proposed Action.

The presence of firmly cemented conglomerate rocks and caliche in the near-surface soils at the plant site under the Proposed Action could pose difficulties for excavation activities during construction.

The risk of adverse ground acceleration (shaking) as a result of seismic events is perceived to be very low throughout the project area. In addition, because of the following three principal reasons, the risk of liquefaction of the soils at the Proposed Action plant site is low: 1) the presence of the cemented conglomerate and caliche in the subsurface; 2) predominance of coarse-grained sediments in the near-surface soils; and 3) deep water table on the order of hundreds of feet (see *Section 3.4, Ground Water Resources*).

Pah Rah Parcel. No construction or operation activities would be associated with the proposed land exchange, and no geological impacts would occur on the Pah Rah parcel.

4.2.2.1.2 Mitigation. No mitigation is required.

4.2.2.2 Alternative 1

4.2.2.2.1 Impacts. No impacts would be associated with Alternative 1, the same as described for the Proposed Action.

4.2.2.2.2 Mitigation. No mitigation is required.

4.2.2.3 Alternative 2

4.2.2.3.1 Impacts. No impacts would be associated with Alternative 2, the same as described for the Proposed Action.

4.2.2.3.2 Mitigation. No mitigation is required.

4.2.2.4 Alternative 3

4.2.2.4.1 Impacts. No impacts would be associated with Alternative 3, the same as described for the Proposed Action.

4.2.2.4.2 Mitigation. No mitigation is required.

4.2.2.5 No Action Alternative

Implementation of the No Action Alternative would result in no change to the Toquop area and Pah Rah parcel. Trends and future conditions in the Toquop and Pah Rah areas under the No Action Alternative would be the same as existing conditions. Therefore, no impacts on geologic features or resources in the Toquop area and Pah Rah parcel would occur.

4.3 Surface Water Hydrology

The following text discusses potential impacts and mitigation associated with surface water in the Toquop area.

4.3.1 Proposed Action

4.3.1.1 Potential to Cause Flooding

4.3.1.1.1 Impacts

Toquop Area. Locally high-intensity rainfall events could cause the local washes in the Toquop project area to carry high volumes of runoff for short periods of time. Some of the features of the Proposed Action are located within a Zone D flood area (undetermined flood hazards) as designated by FEMA.

The flooding potential, however, results mainly from flows in the smaller local washes and not from flows in either the Toquop Wash or the South Fork Toquop Wash, the two principal surface water drainage features in the project area. This conclusion is based on the fact that each of these larger washes has cut deep canyons or arroyos within the project area that are anticipated to contain flows that correspond to a maximum 100-year return interval runoff events.

Plant Site. Six small, unnamed washes cross Section 36 where the power plant would be located under the Proposed Action. The specific disturbed area where the plant structures and facilities would be constructed directly straddles one of these washes. That particular wash, therefore, would be filled and its watercourse diverted to one or more adjacent washes. As a result, the amount and rate of flow in the wash(es) that receive(s) the diverted flows would increase when local rainfall events are great enough to generate runoff.

Construction of the power plant would create areas that are impervious (covered by impermeable surfaces such as roofs, roads, parking areas), which would increase the amount and rate of flow of runoff from local storms. The total area rendered impervious would be approximately 15 acres. Assuming that the maximum daily rainfall at the plant site is approximately 3 inches (NOAA, 1975), the corresponding stormwater runoff from the 15 acres of impervious surfaces would be approximately 3.75 acre-feet, or approximately 2 cubic feet per second (cfs) averaged over 24 hours.

Linear Facilities. During both construction and operation, the linear facilities associated with the Proposed Action (such as, access road, water pipeline, and electricity to the wellfield) would not affect the ephemeral washes they cross.

Under the Proposed Action, the utilities (water pipeline and electricity to the wellfield) would be routed across several washes, including the South Fork Toquop Wash, and through the Toquop Gap, which is the watercourse of the main Toquop Wash. Where the utilities cross the various washes, particularly the Toquop and the South Fork, the utilities would be buried sufficiently deep so as not to affect water flow or erosional processes (scouring) in the bottom of these washes.

The access road under the Proposed Action will utilize culverts to channel storm water under the road. These culverts will be sized appropriately according to local requirements. Therefore, the road would experience flooding only during extreme runoff events, and flooding would not constitute an environmental impact.

Wellfield. The wellhead structures associated with each well would occupy an area of 1 acre or less within the Tule Desert and would be located away from ephemeral washes and other low-lying areas susceptible to flooding. In addition, the impervious surface area around each well would be small (likely less than 300 square feet). No additional surface water runoff would be generated by these impervious areas. Therefore, construction and operation of the wellfield in the Tule Desert would not affect surface water hydrology.

Pah Rah Parcel. No construction or operation activities would be associated with the proposed land exchange, and no surface water impacts would occur on the Pah Rah parcel.

4.3.1.1.2 Mitigation. To effectively mitigate the effects of additional runoff at the plant site resulting from impervious surfaces, the Proposed Action would include a stormwater retention basin with sufficient dimensions to accommodate the runoff generated by the local maximum daily rainfall event of 3 inches or less. All runoff from the impervious surfaces would be directed to this retention basin prior to being released to the natural drainage system at flow rates equivalent to pre-development conditions.

To minimize the exposure of personnel and equipment to potential flood hazards, construction activities in the washes would be scheduled to occur when the probability for flash flooding is minimal. These measures are included in *Appendix B, Standard Construction and Operation Procedures.*

4.3.1.2 Potential for Surface Water Quality Degradation

4.3.1.2.1 Impacts

Toquop Area. Both project construction and operation in the Toquop area provide opportunity to potentially affect the surface water quality of the local washes and, in turn, the Virgin River. Water quality in the washes could be degraded by the addition of both suspended solids (sediment) and dissolved constituents (substances commonly found in stormwater runoff from parking lots and industrial areas).

During construction, earthmoving activities could increase the potential for erosion from precipitation, which, in turn, would contribute additional suspended solids (sediment load) to the runoff in the local washes. During operation, diverted runoff from the wash filled in to accommodate construction of the power plant could increase the potential for erosion, and, therefore, result in increased sediment loads in the receiving wash(es).

In addition, runoff from parking surfaces and possibly areas where plant equipment could come in contact with precipitation could add low concentrations of dissolved petroleum hydrocarbons, metals, and possibly other substances to the runoff in the local washes. Runoff from the access road could also contribute low concentrations of similar dissolved substances to the flows in the local washes.

With the implementation of commitments in *Appendix B*, no impacts to surface water quality are anticipated from the utilities that link the wellfield to the plant site, or from the development and operation of the wellfield.

Pah Rah Parcel. No construction or operation activities would be associated with the proposed land exchange, and no surface water impacts would occur on the Pah Rah parcel.

4.3.1.2.2 Mitigation. No additional mitigation is required other than a retention basin to contain stormwater runoff.

4.3.2 Alternative 1

4.3.2.1 Impacts

Existing conditions and potential impacts to surface water hydrology in the Alternative 1 project area are similar to those for the Proposed Action. The only substantive difference is that Alternative 1 does not involve crossing the South Fork Toquop Wash by the utilities. Both alternatives, however, do involve crossing the Toquop Wash, and the impacts would be the same because only the location of the crossing would differ.

4.3.2.2 Mitigation

The mitigation measures described for the Proposed Action (retention basin to contain stormwater runoff) would also be taken under Alternative 1.

4.3.3 Alternative 2

4.3.3.1 Impacts

Existing conditions and potential impacts to surface water hydrology in the Alternative 2 project area are largely similar to those for the Proposed Action. The principal exception is that the power plant site under Alternative 2 (the northern site) does not contain any washes that would have to be diverted.

4.3.3.2 Mitigation

The mitigation measures described for the Proposed Action (retention basin to contain stormwater runoff) would also be taken under Alternative 2.

4.3.4 Alternative 3

4.3.4.1 Impacts

Existing conditions and potential impacts to surface water hydrology in the Alternative 3 project area are the same as those for the Proposed Action.

4.3.4.2 Mitigation

The mitigation measures described for the Proposed Action (retention basin to contain stormwater runoff) would also be taken under Alternative 3.

4.3.5 No Action Alternative

No changes to the existing surface water hydrologic conditions would occur under the No Action Alternative; therefore, no impacts to surface water hydrology would occur.

4.4 Ground Water Resources

This section evaluates the potential impacts associated with pumping ground water from the Tule Desert to supply up to 7,000 acre-feet of water per year (afy) for 42 years to the proposed project. These impacts not only include the potential project-induced effects on ground water resources, but also the potential project-induced effects on other water resources (springs and surface water bodies).

4.4.1 Ground Water Resources—Incomplete and/or Unavailable Information

During the preparation of this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project,* information was incomplete and/or unavailable in three principal areas associated with the assessment of environmental consequences to ground water resources:

- The amount and movement of ground water in the basin-fill deposits within the Tule Desert.
- The amount and movement of ground water in the fractured-rock aquifer underlying both the Tule Desert and the Virgin River Valley hydrographic areas.
- The location(s) and amount(s) of ground water recharge and discharge from the fractured-rock aquifer underlying the Tule Desert.

It is recognized that the lack of complete information in these areas may lead to differences of professional scientific opinion on the degree of potential environmental consequences both to ground water resources and to flows in the Virgin River within the lower Virgin River Valley, as a result of the Proposed Action or the Alternatives 1 and 2.

In addition, inasmuch as the ground water resources of the Tule Desert have not been developed to date, the potential ground water level declines and possible changes in water quality resulting from the Proposed Action, or the action alternatives, can only be estimated. Moreover, the combination of incomplete information, coupled with different available approaches in making these estimates, may lead to differences of opinion as to what the potential water level declines are likely to be.

A discussion of the relevance of incomplete information on these areas is presented below with respect to the assessment of environmental impacts to ground water resources, and to the relationship between withdrawing ground water in the Tule Desert and flows in the Virgin River.

4.4.1.1 Basin-Fill Deposits in the Tule Desert

Information to characterize the basin-fill deposits in the Tule Desert is incomplete and/or unavailable in specific areas. The most important of these areas with respect to the analysis of potential impacts include:

- The physical properties of the saturated basin-fill deposits.
- The source and amount of ground water recharge specifically to these deposits.
- The direction and rate of ground water flow and ground water discharge or outflow from these deposits.

The incomplete and/or unavailable information in these areas is primarily relevant to the assessment of the potential for decline in ground water levels and the depletion of ground water resources in the basin-fill deposits, but it also has relevancy to the issue of potential ground water discharge to the Virgin River.

4.4.1.1.1 Physical Properties. Data to quantify the transmissive and storage characteristics of the basin-fill deposits are very limited. Neither aquifer nor in-situ

hydraulic conductivity testing have been performed on wells that exclusively tap ground water in the Tule Desert basin-fill deposits, nor is this type of testing currently feasible without installing wells specifically for this purpose.

With respect to transmissive properties of the basin-fill deposits, the only known data are from a single measurement event at the Tule Desert Well reported in Hydrosystems (2002). This well, which is located in the south central portion of the Tule Desert (Figure 3-5), is 605 feet deep. The driller's log, which is on file with the Nevada State Engineer, indicates that the local stratigraphy at this well is composed of sand and gravel from zero to 435 feet, gravel between 435 and 461 feet, and red clay between 461 and 605 feet. The results of recent water-level measurements by Hydrosystems, reported in *Section 4.1.2.3* of CH2M HILL (2002b), indicate that when this well was pumped at a rate of 8 gallons per minute (gpm), the water level in the well declined immediately by approximately 100 feet. In addition, this level of drawdown remained constant with continued pumping over a 3-day period at the same rate. Based on the method presented in Walton (1962), this water level response corresponds to a value of transmissivity of approximately 1,000 gallons/day/foot of saturated thickness (gpd/ft). This value is considered very low (i.e., the saturated basin-fill deposits are not very transmissive in the vicinity of the Tule Desert Well).

Specific yield (the ratio of the volume of water that a given mass of saturated soil will yield by gravity to the volume of soil) represents the storage properties of the basin-fill deposits. The value of specific yield presented in this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* is estimated from the technical literature (CH2M HILL, 2002b). There are no field data available to determine the storage properties of the basin-fill deposits directly.

These physical properties are important to the impact analysis because they are key input parameters to the estimation of potential water level decline as a result of the Proposed Action or the action-based alternatives. Because specific information on the physical properties of the basin-fill deposits is incomplete and/or unavailable, the impacts analysis in the EIS conservatively assumes that the values are the same as for the underlying fractured-rock aquifer for which data are available from aquifer testing. The assumption (i.e., that the properties are the same) is conservative because the resulting calculated water level declines in the basin-fill deposits are overestimated in the analysis (CH2M HILL, 2002b).

4.4.1.1.2 Basin-Fill Ground Water Recharge, Flow Direction(s), and Discharge

Ground Water Recharge. The amount of ground water recharge directly into the basin-fill deposits in the Tule Desert is unknown. As discussed below in *Section 4.4.1.2.2, Fractured-Rock Aquifer Recharge and Ground Water Sources*, estimates of the amount of recharge in the Tule Desert, via precipitation, ranges from 2,102 afy (Glancy and Van Denburgh, 1969) to 8,968 afy (Katzer et al., 2002). In addition to the uncertainty over a representative value of annual recharge, there is considerable uncertainty as to how much of this recharge, if any, continues through the basin-fill deposits and flows into the underlying fractured-rock aquifer. This latter point is important in the

understanding of the overall water balance of the basin-fill deposits in the Tule Desert, and the comprehension of the occurrence and movement of ground water in these deposits.

As discussed below in *Section 4.4.1.2.2, Fractured-Rock Aquifer Recharge and Ground Water Source*, the data are limited concerning the degree of hydraulic interconnection between the basin-fill deposits and the underlying fractured-rock aquifer. From ground water level data at the MW-2 well cluster, the vertical hydraulic gradient is downward (implying that the tendency is for ground water to flow from the basin-fill deposits into the underlying fractured rock) in this portion of the Tule Desert. The available water chemistry data, however, do not support the conclusion that ground water in the fractured rock is recharged from the overlying sediments to any measurable degree (i.e., ground water in the fractured rock is not chemically linked to local recharge). Therefore, the currently available information suggests that most of the precipitation derived recharge remains in the basin-fill deposits until it discharges from the basin, but that there is the potential for some recharge to flow into the underlying fractured rock in some portions of the Tule Desert.

Ground Water Flow Directions. Reliable ground water level data that are representative of conditions in the basin-fill deposits in the Tule Desert are available only from the Tule Desert Well, MW-2 (shallow), and MW-5. However, based on the much higher water levels consistently recorded in the Tule Desert Well, together with the thick sequence of clay observed at that location, the water levels measured in the Tule Desert Well suggest that the ground water is perched at that location. This implies that the water levels in the Tule Desert Well are not representative of a continuous aquifer unit within the basin-fill deposits (CH2M HILL, 2002b). This conclusion is also consistent with the lack of physical basis for the elevation of ground water to be locally high in the vicinity of the Tule Desert Well. As a result, only the available water level data from MW-2 (shallow) and MW-5 are considered to be representative of a potentially continuous aquifer unit in the basin-fill deposits. Because data from three locations are required to define the water table mathematically, the current information is insufficient to establish scientifically the direction of ground water flow in the basin-fill deposits within the Tule Desert.

However, the assumption is made in this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* that ground water in the basin-fill deposits generally mimics the topographic surface of the Tule Desert and therefore flows from areas of higher elevations (in the northern areas at the base of the Clover Mountains) to areas of lower elevations (toward the south and toward Toquop Gap). This is a common assumption for ground water systems that are not confined under pressure.

Basin-Fill Ground Water Discharge. As discussed above, there is considerable uncertainty with respect to the direction and rate of ground water flow in the Tule Desert basin-fill deposits. As a result of the historic and current absence of ground water pumping (that is, no change in the amount of ground water in storage in the basin fill) the amount of ground water inflow should balance the amount of ground water discharge. The Toquop Gap is the only one place where the basin-fill deposits of the two adjacent hydrographic units (Tule Desert and Virgin River

Valley) merge. Toquop Gap is also the topographic low point in the Tule Desert. Accordingly, it initially is a logical point to consider ground water to flow from the Tule Desert into the Virgin River Valley. However, while some ground water may flow through the gap, it is doubtful that the saturated cross sectional area is large enough to accommodate all of the recharge to Tule Desert basin-fill identified above [that is, estimates range up to 8,968 acre-feet per year (afy)]. Inasmuch as there are no monitoring wells in the vicinity of Toquop Gap, it is not possible to confirm the foregoing hypothesis, or calculate directly how much ground water, if any, flows through the Toquop Gap.

In Section 3.4.2.1.1, the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* assumes that much of the ground water in the basin-fill deposits discharges into the shallow fractured-rock around the downgradient perimeter of the Tule Desert (i.e., flows through fractures and faults in the rocks that comprise the Tule Springs Hills and the East Mormon Mountains that abut the saturated basin-fill deposits). Although specific information is unavailable to confirm this ground water discharge hypothesis, the conclusions in the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* are consistent with other reports that touch upon this issue (Glancy and Van Denburgh, 1969; Dixon and Katzer, 2002; and Katzer et al., 2002).

4.4.1.2 Fractured-Rock Aquifer Underlying the Tule Desert

Information to support the characterization of the fractured-rock aquifer underlying the Tule Desert is incomplete and/or unavailable in some fundamental aspects. The most important of these aspects with respect to the analysis of potential impacts include:

- The spatial variation in the values of the physical properties.
- The source and amount of ground water recharge specific to this aquifer both within the Tule Desert and regionally.
- The amount of reasonably accessible ground water in storage in this aquifer both within the Tule Desert and regionally.

4.4.1.2.1 Spatial Variation in Physical Properties of the Fractured-Rock Aquifer.

All of the available data that support the quantification of the physical properties of the fractured-rock aquifer come from the aquifer testing on PW-1. While these data are directly relevant and critical to the assessment of potential impacts, they are known only to be representative of the aquifer conditions in the vicinity of PW-1. Because of the observed geologic complexity in the adjacent Tule Springs Hills, and the reported geologic complexity of the underlying fractured-rock, it is highly probable that aquifer testing in other portions of the Tule Desert would yield different values of the transmissive and storage properties of the fractured-rock aquifer.

In *Section 4.4.1.1* of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*, the aquifer test results are used in the impacts analysis as the basis for selecting parameter values for the calculation of potential water level

declines. To address the uncertainty in the spatial representativeness of the available data, the values of the physical properties were selected to produce the greatest water level decline (i.e., tend toward overestimation of the resulting decline) (CH2M HILL, 2002b). In that way, the results of the impact analysis are conservative.

4.4.1.2.2 Fractured-Rock Aquifer Recharge and Ground Water Source.

Three reports [(Glancy and Van Denburgh (1969); Katzer et al. (2002); and Walker and Associates (2002)] have quantified ground water recharge, via precipitation, to the Tule Desert. The results range from 2,102 afy (Glancy and Van Denburgh, 1969) to 8,968 afy (Katzer et al., 2002). These values, however, represent total recharge via precipitation, and do not take into account the additional amount of ground water that flows into the aquifer from upgradient locations. There are, therefore, two principal uncertainties with respect to the source of water to the Tule Desert fractured-rock aquifer:

- The portion of the precipitation-derived recharge, identified above, that actually reaches the fractured rock aquifer.

- The amount and origin of the ground water that flows into the Tule Desert fractured-rock aquifer from upgradient locations.

The available water quality data indicate that ground water in the basin-fill deposits is isotopically and chemically different than the ground water in the underlying fractured-rock aquifer (CH2M HILL, 2002a). However, the water level response during the aquifer testing, together with data from the MW-2 well that indicate a downward vertical gradient between the basin-fill and the underlying fractured rock, support the conclusion that the two aquifers are hydraulically connected. Accordingly, some portion of the precipitation derived recharge likely flows into the underlying fractured-rock.

The available water chemistry and isotopic data also indicate that the ground water from PW-1 has a uniquely similar chemical signature to carbonate springs located approximately 30 miles north of the northern edge of the Tule Desert (CH2M HILL, 2002a, CH2M HILL, 2002b). The implication is that ground water from PW-1 is representative of the regional carbonate rock province described in *Section 3.4.1.2.2*. Accordingly, the ground water that would supply the Proposed Action and the action alternatives, is considered to be derived from a vast regional ground water system, and is not limited locally to the Tule Desert. Although the most reliable data from the Tule Desert that support this conclusion are limited to the area around PW-1, there is clearly chemical similarity between ground water from PW-1 and the upgradient carbonate springs.

The origin of the ground water from PW-1 is also important from the perspective of potential impacts to existing ground water users in the Virgin River Valley. Katzer et al. (2002) state that the ground water from PW-1 in the Tule Desert is chemically similar to wells operated by the Virgin Valley Water District (VVWD), the implication being that pumping from PW-1 would directly affect the source of water to VVWD wells. However, the VVWD wells in question are on the Nevada-Arizona state line and, based on water-level trends developed by Katzer et al. (2002), these wells are not hydraulically downgradient of the Tule Desert. No wells that are hydraulically downgradient of the Tule

Desert, to the extent that water level information is available to make such a conclusion, have the same chemical signature as the wells currently in the Tule Desert.

4.4.1.3 Ground Water Discharge from the Tule Desert Fractured-Rock Aquifer

Information to support the direction and characteristics of ground water flow within the fractured-rock aquifer downgradient of the Tule Desert hydrographic area is incomplete and/or unavailable. As a result, it is not possible to state with certainty where ground water in the Tule Desert fractured-rock aquifer discharges. In the absence of such information, the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* assumes that ground water continues to flow in a similar direction as determined from the water level data in the Tule Desert (i.e., it flows toward the south). This is consistent with the conclusion that ground water in the Tule Desert fractured-rock aquifer is part of the vast regional carbonate rock province, where previous investigators have identified the direction of groundwater flow as generally being toward the south.

4.4.1.4 Analysis of Water Level Decline in the Fractured-Rock Aquifer

The potential water level decline in the fractured-rock aquifer is presented in *Section 4.4.1.1.1* of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* based on the results of an analysis reported in CH2M HILL (2002b). As discussed in this document, the approach taken in the impacts analysis was to employ a numerical ground water model to simulate the anticipated water level declines that might be induced by withdrawals of up to 7,000 afy. This approach was taken largely because of the relatively steep hydraulic gradient observed in the Tule Desert fractured-rock aquifer. A pronounced hydraulic gradient has the effect of limiting the lateral extent of the capture zone of a pumping well. The presence of a hydraulic gradient also necessarily implies that the aquifer is being recharged by flow from upgradient sources, as observed in the Tule Desert, and discussed above.

Katzer et al. (2002) also performed an analysis of the potential water level declines induced by withdrawals of up to 7,000 afy. However, their analysis does not take into account any hydraulic gradient, nor does it take into account ground water flow from upgradient locations. Consequently, the conclusions of Katzer et al. (2002) consist of significantly greater potential water level declines than concluded in this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project.*

4.4.1.5 Conclusion

Although the currently available information is not complete in all areas, the information that is currently available is adequate to support the conclusions regarding adverse environmental impacts and to make a reasoned choice among alternatives. The availability of additional data is not expected to alter the conclusions with regard to ground water presented below.

4.4.2 Proposed Action

4.4.2.1 Potential for Decline in Ground Water Levels and Depletion of Ground Water Resources

4.4.2.1.1 Impacts

Toquop Area. Pumping water from the fractured-rock aquifer in the Tule Desert in the amount and rates necessary to serve the proposed project would not result in a substantial decline in ground water levels or a substantial depletion of ground water resources. Water levels within the Tule Desert would be lowered as a result of project pumping, but not to the extent that a substantial depletion of ground water resources would occur.

Outside the Tule Desert, specifically in the Virgin River Valley hydrographic area, ground water levels, as well as the availability of the ground water resources, would remain unchanged as a result of pumping in the Tule Desert.

Specifically, based on the results of an analysis of potential water level decline (drawdown) presented in CH2M HILL (2002), ground water levels will be lowered within the Tule Desert a minimum of approximately 45 feet within a radius of approximately 1,000 feet from a representative production well (pumping at a rate of 1,100 gallons per minute [gpm]) under the conditions determined from the local aquifer testing (see *Section 3.4.2.1.2, Ground Water in the Fractured Rock*). The maximum drawdown would remain above the top of the fractured-rock aquifer and no de-watering of the aquifer would occur.

The same representative well would drawdown the water level 0.5 foot at a distance of roughly 1.5 miles from the well. Beyond 1.5 miles from a representative well, the drawdown would be less than 0.5 foot. Accordingly, project pumping would not result in a substantial water-level decline outside of the Tule Desert because the wellfield would be designed such that the wells would be: 1) spaced to minimize additive effects on drawdown; and 2) located at least 1.5 miles from the edge of the Virgin River Valley hydrographic area.

These results occur largely because of the steep lateral hydraulic gradient in the Tule Desert fractured-rock aquifer (discussed in *Section 3.4.2.1.2, Ground Water in the Fractured Rock*. The steep gradient is indicative of the relatively poor ability of the Tule Desert fractured-rock aquifer to transmit ground water (low tranmissivity), which acts to limit the lateral extent of water level decline around a pumping well (that is, the lower the transmissivity, the smaller the radius of influence around a well). In addition, the steep gradient means that most of the water entering the project wells would do so from the upgradient direction (from the north in the Tule Desert), causing water level declines to be less over a similar distance south of the production wells toward the downgradient Virgin River Valley.

Although the water levels will be lowered in the vicinity of each production well, there would be no major dewatering of the fractured rock aquifer or depletion of the ground water resource within the Tule Desert. The amount of annual ground water flow through a 4-mile wide portion of the basin within the fractured-rock aquifer has been estimated to be slightly less (6,500 afy) than the amount of water required for the project (up to 7,000 afy). Additional ground water also flows within the Tule Desert outside this 4-mile width

and at depths greater than investigated to date (see *Section 3.4.2.1.2, Ground Water in the Fractured Rock*).

As long as the fractured-rock aquifer is not de-watered (that is, the water level does not decline below the top of the fractured rock), the lower water levels correspond to a localized decrease in the pressure exerted by the water in the fractures, and do not represent a major loss of water from storage. This occurs because the aquifer is confined under pressure, and would continue to be confined during project pumping as long as the fractured rock remains fully saturated.

In the Tule Desert basin-fill deposits, the actual extent of the water level decline that would be caused by project pumping is unknown because of the aquifer complexity and the limited available data. However, the amount of ground water level decline in the basin-fill would be no greater than that anticipated for the fractured rock, and most likely considerably less based on the understanding that the ability of the basin-fill deposits to transmit water (aquifer transmissivity) is very low and because ground water in the basin fill is assumed to be unconfined (see *Section 3.4.2.1.1, Ground Water in the Basin Fill* and CH2M HILL, 2002). For the purpose of this impacts assessment, the water level decline is conservatively assumed to be the same in the basin fill as it is in the fractured rock. Accordingly, there would not be a substantial water-level decline in the basin fill material outside of the Tule Desert.

The only known current water well that taps basin-fill ground water in the Tule Desert is the Tule Well, which is capable of pumping approximately 8 gpm on demand. Given the distance of this well from the area where the project wells are likely to be located (that is, it is located more than 1.5 miles from where a project well would be located), together with the small well yield and water demand associated with this well, it is unlikely that this well would be adversely affected by project pumping.

There are no current users of ground water from the fractured-rock aquifer in the Tule Desert. Consequently, no existing wells would be affected by the water level decline that would occur in the fractured-rock aquifer within the Tule Desert.

Because ground water in Virgin River Valley is a vital source of water to municipalities and agriculture in the region, the potential impacts of project pumping on this resource must be assessed thoroughly. Therefore, in addition to the drawdown analysis, presented above, which indicates that water level declines will be restricted to roughly 1.5 miles from the pumping wells, the conclusion that project pumping would not result in either substantial ground water level declines or a substantial loss of the ground water resource within the Virgin River Valley is further supported by the following factors:

- As presented in *Section 3.4.2.2.3, Aquifer Characteristics*, the available perennial yield in the lower Virgin River Valley is estimated by Dixon and Katzer (2002) to be approximately 40,000 afy, even after the current local pumping in the Virgin River Valley, reported to be about 12,000 afy, is taken into account. This estimate implies that even if the entire project demand were to be pumped directly from the lower Virgin River Valley, there would still be 33,000 afy of perennial yield available within the Virgin River Valley.

- The volume of ground water in storage in the uppermost 100 feet of saturated sediments in the Virgin River Valley is estimated to be close to 3 million acre-feet. This volume is more than 10 times the entire 42-year water demand of the project. A vast amount of ground water is, therefore, stored within the Virgin River Valley. Even in the absence of available perennial yield, this much water in storage effectively mitigates the extent of water level decline caused by local pumping. Consequently, even if the entire project demand were pumped directly from the Virgin River Valley, and not from the proposed location in the Tule Desert, the resulting water level decline in the Virgin River Valley could be controlled through the wellfield design such that no existing wells would be adversely affected. In other words, through optimizing the spacing of the wells, the water level decline associated with pumping up to 7,000 afy could be kept at levels that would not affect the water levels in existing production wells within the Virgin River Valley).

  This conclusion is further supported by the results of two different analyses, the first being the results of the Tule Desert drawdown analysis discussed above. The Muddy Creek Formation is understood to be no more transmissive than the fractured-rock aquifer of the Tule Desert. Accordingly, a similar limited area of influence of a given pumping well in the Tule Desert should also occur in the Muddy Creek Formation (that is, drawdowns of no more than approximately half a foot at distances of roughly 1.5 miles from the pumping well).

  Second, the results of a study of spatially concentrated pumping 10,000 afy from the Muddy Creek Formation in the vicinity of Halfway Wash indicates that drawdowns on the order of 5 feet extend no more than 6 miles from the pumping center after 50 years (Las Valley Water District, 1992).

- Based on the generally southern direction of the hydraulic gradient of ground water in the Tule Desert fractured-rock, ground water inflow from the wellfield portion of Tule Desert into the Virgin River Valley occurs primarily west of Toquop Wash and downgradient of the current municipal production wells that serve the towns of Mesquite and Bunkerville. This implies that ground water intercepted by the project wells in the Tule Desert would not flow, in the absence of project pumping, toward existing Virgin River Valley wells. Project pumping, therefore, would not affect ground water flowing to existing Virgin River Valley wells, and water levels in these wells would similarly not be affected by the proposed project.

- A comparison of the C-14 data from the fractured-rock aquifer in the Tule Desert (PW-1) with the available data from municipal wells in the Virgin River Valley (Bunkerville 1 and 2, and Virgin Valley 5 and 25) clearly indicates that age of the ground water is significantly different between these two areas—implying a different source for each water type. Pumping in the Tule Desert, therefore, would not affect the existing municipal wells in the Virgin River Valley because they have independent sources.

Specifically, the value of C-14 at PW-1 (0.9 percent modern carbon) approaches the maximum age for using C-14 for dating purposes (approximately 40,000 to 50,000 years old; see *Section 3.4.2.1.2, Ground Water in the Fractured Rock*).

Carbon-14 data from the municipal production wells in the Virgin River Valley reveal the following two related occurrences: 1) the ground water from the Virgin River Valley wells is younger than the ground water from PW-1 in the Tule Desert; and 2) the age of the ground water from the Virgin River Valley wells increases from east to west (that is, in a downstream direction along the Virgin River). Both of these observations support the occurrence of independent ground water flow paths between the proposed wellfield area in the Tule Desert and the existing municipal wells in the Virgin River Valley. Specifically, they reinforce the conclusions made above that ground water that currently flows beneath the Tule Desert enters the Virgin River Valley downstream of the Virgin Valley municipal wells.

With respect to the regional carbonate-aquifer system, the rate of ground water extraction for this project would be only a small fraction of the total capacity of the aquifer. Within the Colorado River Basin, the flow has been estimated to be approximately 200,000 afy (see *Section 3.4.1.2.2, Carbonate Rock Province*). The project demand of approximately 7,000 afy is 3.5 percent of that amount. The Nevada State Engineer has approved 2,100 acre-feet of water per year of the Vidler Water Company—Lincoln County water right applications. Vidler Water Company—Lincoln County have an application for additional water adequate to operate the power plant. The application is being held aside pending results of additional hydrologic studies.

Pah Rah Parcel. No construction or operation activities would be associated with the proposed land exchange, and no ground water impacts would occur on the Pah Rah parcel.

4.4.2.1.2 Mitigation. No mitigation is required.

4.4.2.2 Spring Discharge

4.4.2.2.1 Impacts

Toquop Area. Pumping water from the fractured-rock aquifer in the Tule Desert in the amount and rates necessary to serve the proposed project would not result in a change in the flows of the springs in the hills and mountains that rim the Tule Desert.

As discussed in *Section 3.4.2.1.3, Springs*, the source of water to the springs in the project area is local recharge (that is, precipitation that infiltrates near to these springs and subsequently travels a relatively short distance before being discharged at a spring). In addition, the elevations of all of the local springs are several hundred feet above the local and regional ground water levels, further indicating the springs are not connected to the ground water systems of the Tule Desert. The rate of discharge of the springs is therefore independent of ground water in both the fractured-rock and the basin-fill aquifers, and pumping from the fractured-rock aquifer within the Tule Desert would not affect the discharge of any spring.

In addition, pumping from the fractured-rock aquifer in the Tule Desert would not affect any of the regionally significant springs in the vicinity of the project area, including the Littlefield Springs, Muddy Springs and the springs adjacent to the shore of Lake Mead. Although some of these springs are related to the regional carbonate aquifer, the ground water that discharges from these springs is not related to ground water in the Tule Desert (i.e., ground water in the Tule Desert is not the source of any of these springs; they all can be traced to different sources) (*Section 3.4.2.1.3, Springs*).

Pah Rah Parcel. No construction or operation activities would be associated with the proposed land exchange, and no impacts on springs would occur on the Pah Rah parcel.

4.4.2.2.2 Mitigation. No mitigation is required.

4.4.2.3 Ground Water Quality

4.4.2.3.1 Impacts

Toquop Area. Ground water quality would not be degraded as a result of the proposed project. The pumping of ground water and the resulting localized water level declines would not alter the water quality of the aquifer systems in the Tule Desert.

The quality of the ground water in the fractured-rock aquifer of the Tule Desert is likely to be highly variable across the basin because of the different compositions of the rock (for example, limestone, volcanic rocks, siltstone with possible gypsum layers) (see *Section 3.4.2.1.2, Ground Water in the Fractured Rock*). As a result, the quality of the ground water pumped in the Tule Desert could change over time as ground water flows from different rock types to the wells and the influence of specific fractures that contribute ground water to the wells changes. These potential changes in the quality of the water pumped, however, would not imply a degradation in water quality of the aquifer.

The temporary handling and storage of potential chemical substances and waste products have a slight potential to affect ground water quality adversely at the locations of the plant sites should there be a release of these substances to the environment. The potential for ground water-quality degradation is minimal, however, because the climate is arid, which reduces the potential for infiltration into the ground, and the depths to ground water are considerable (on the order of several hundred feet).

Pah Rah Parcel. No construction or operation activities would be associated with the proposed land exchange, and no ground water impacts would occur on the Pah Rah parcel.

4.4.2.3.2 Mitigation. No mitigation is required.

4.4.2.4 Flow in the Virgin River

4.4.2.4.1 Impacts. The flow in the Virgin River would not be affected by pumping in the Tule Desert for the Proposed Action. As discussed in *Section 3.4.2.2.4, Virgin River/Ground Water Interaction*, multiple lines of evidence indicate that the Virgin River is not recharged by regional ground water systems as it flows from Littlefield, Arizona, to Lake Mead. In fact, it has been demonstrated that the river naturally loses flow through infiltration, evaporation, and diversion for irrigation along this area.

In addition, a comparison of water-chemistry data from the river and the ground water in the Tule Desert indicates that there is no connection between the two waters (see *Section 3.4.2.2.4, Virgin River/Ground Water Interaction*). Furthermore, an analysis of the chemical data from the Virgin River reveals that the origin of the flows in the river downstream of Littlefield are from Beaver Dam Wash and upstream Virgin River flows (that is, all of the flow in the river can be accounted for through these sources, none of which can be attributed to ground water).

4.4.2.4.2 Mitigation. No mitigation is required.

4.4.2.5 Land Subsidence

4.4.2.5.1 Impacts

Toquop Area. Based on detailed analysis of the soil conditions in the Tule Desert basin-fill deposits, and the potential drawdown that could occur in these deposits as a result of project pumping, the potential for land subsidence is minimal and the corresponding loss of storage negligible.

Specifically, the maximum amount of settlement ranges between 0.3 inches and 0.6 inches in the vicinity of PW-1 and MW-4, and between 2.5 inches (for the clayey sand) and up to 13 inches (for the silty sand) in the vicinity of MW-2 (CH2M HILL, 2002; *Appendix F*). The maximum corresponding percent reduction in porosity is less than 1 percent.

Pah Rah Parcel. No construction or operation activities would be associated with the proposed land exchange, and no land subsidence would occur on the Pah Rah parcel.

4.4.2.5.2 Mitigation. No mitigation is required.

4.4.3 Alternative 1

4.4.3.1 Impacts

The impacts for Alternative 1 would be the same as those for the Proposed Action.

4.4.3.2 Mitigation

No mitigation is required

4.4.4 Alternative 2

4.4.4.1 Impacts

The impacts for Alternative 2 would be the same as those for the Proposed Action.

4.4.4.2 Mitigation

No mitigation is required.

4.4.5 Alternative 3

4.4.5.1 Impacts

Under Alternative 3, the demand for ground water would be 170 afy, which is considerably less than under the Proposed Action or either Alternative 1 or Alternative 2, both of which require up to 7,000 afy. The effects associated with using 7,000 afy of ground water from the Tule Desert are evaluated in *Section 4.4.2.1.1, Impacts,* and have been determined to be minimal.

The water demand of 170 afy under Alternative 3 would require the construction and operation of fewer wells and reduced pumping rates relative to the Proposed Action and Alternatives 1 and 2. Specifically, Alternative 3 would require

only two production wells (one principal well with a second one to provide back-up supply during maintenance periods), and the maximum pumping rate would be on the order of 250 gpm or less. The total area of disturbed land would be reduced under Alternative 3 to 2 acres for the production wells (an additional acre of disturbed land would still be required for a monitoring well for a total disturbed area of 3 acres).

Changes in both the total water level decline and the radius of influence resulting from the pumping would be considerably less under Alternative 3 than under the Proposed Action or either Alternative 1 or Alternative 2 because of the substantially reduced annual water demand under Alternative 3. Water level declines under Alternative 3 would similarly be less than under the Proposed Action and Alternatives 1 and 2 because the maximum pumping rates are approximately 30 times less under this alternative.

With respect to potential impacts to spring discharge, the impacts analysis in *Section 4.4.1.3.1* concludes that the impacts of the Proposed Action are unlikely primarily because of the lack of interconnection between the source of water to the springs and the ground water in the Tule Desert. Accordingly, the impacts to spring discharge from Alternative 3 should similarly be less than significant. Likewise, the analysis of potential impacts to the Virgin River under the Proposed Action determined that these impacts would be unlikely because there is no evidence of a direct connection between fractured-rock ground water in the Tule Desert and flows in the Virgin River (*Section 4.4.2.4, Flow in the Virgin River*). Accordingly, the impacts to flows in the Virgin River under Alternative 3 are also considered unlikely.

Regarding the analysis of potential impacts to ground water quality and land subsidence, both of these areas of potential impact are related to the potential water level declines. Inasmuch as the water level declines under Alternative 3 are considered to be small, the impacts to ground water quality and land subsidence under Alternative 3 are similarly considered to be minimal.

4.4.5.2 Mitigation

No mitigation is required.

4.4.6 No Action Alternative

There would be no changes to the existing ground water conditions under the No Action Alternative; therefore, there would be no impacts.

4.5 Biological Resources

4.5.1 Threatened, Endangered, and Sensitive Species

4.5.1.1 Proposed Action

4.5.1.1.1 Impacts

Toquop Area. Direct impacts (effects) on threatened, endangered, and sensitive species can result from ground disturbance caused by construction-related activities and project operation and maintenance. Indirect impacts can result from increased public access and project maintenance. Ground disturbance impacts vegetation by habitat destruction and degradation resulting from soil compaction and vegetation removal, and by erosion when vegetation is lost. The loss of vegetative

cover can adversely affect sensitive wildlife species dependent on vegetation for food or cover. Impacts can occur as a result of construction, operation, and maintenance of the power plant and associated facilities.

Ground disturbance can also have a more permanent impact because of the take of wildlife species. Wildlife can be adversely impacted by increased human activity that causes wildlife harassment, legal and non-legal take of wildlife species, take from vehicles on roads or increased off-road use, and general disturbance of wildlife. Long-term impacts can occur from loss of vegetation and wildlife habitat resulting from the slow process of revegetation in disturbed areas, because of erosion, or continued disturbance from maintenance.

Desert Tortoise. Table 4-1 lists acres of desert tortoise designated critical habitat and desert tortoise habitat not designated as critical that would be temporarily or permanently disturbed under the Proposed Action and Alternatives 1, 2, and 3. Direct impacts on desert tortoise habitat would result from ground disturbing construction activities. Project features and construction rights-of-way associated with the Proposed Action would be located on approximately 449 acres of desert tortoise habitat, 222 acres of which have been designated as critical habitat. Assuming an average density of approximately 11 desert tortoises per square mile (640 acres) in the general area (see affected environment discussions in *Section 3.5.1, Threatened, Endangered, and Sensitive Species*), 449 acres would provide habitat for 8 desert tortoises. The net new long-term disturbance of 182 acres, following reclamation of disturbed sites (see Table 4-1), would provide habitat for three desert tortoises. The resultant short-term and long-term loss of vegetation would reduce the amount of forage available to tortoises. Activities associated with project construction could potentially injure or kill tortoises. Vehicles and heavy construction equipment pose the greatest hazard to tortoises and their burrows. Fencing meeting the requirements for tortoise exclusion would be used around the power plant. Tortoise fencing installed along the access road under the Proposed Action would minimize or eliminate the potential for highway-related mortality (see below and *Appendix A, Measures for Protecting Desert Tortoises and Their Habitat,* for a discussion of this and other desert tortoise mitigation measures). This access road would pass through the Mormon Mesa ACEC and desert tortoise critical habitat.

Indirect impacts on tortoises could result from increases in human activity during construction, operation, and maintenance. Impacts from increased human activity could include further habitat disturbance from recreational OHV activity, direct mortality from off-road vehicles crushing tortoises, increased illegal collecting of tortoises, and mortality from vandalism (for example, shooting). Protective measures, particularly fencing requirements, would be effective in reducing potential impacts from traffic on the access road to the plant site. With tortoise undercrossings provided at intervals of not greater than 1 mile on the access road, habitat fragmentation resulting from road improvements would not be a concern. Potential impacts from maintenance of the water pipeline would be greatly reduced through worker education measures.

TABLE 4-1
Desert Tortoise Habitat Disturbed under the Proposed Action and Action Alternatives

	Proposed Action	Alternative 1	Alternative 2	Alternative 3
Desert Tortoise Designated Critical Habitat				
Acres temporarily disturbed and/or in construction rights-of-way	222	222	266	222
Acres permanently disturbed	61	61	73	61
Desert Tortoise Habitat Not Designated Critical				
Acres temporarily disturbed and/or in construction rights-of-way	227	229	315	195
Acres permanently disturbed	121	123	164	89
Total Desert Tortoise Habitat				
Acres temporarily disturbed and/or in construction rights-of-way	449	451	581	417
Acres permanently disturbed	182	182	237	150

Southwestern Willow Flycatcher, Yuma Clapper Rail, Woundfin, and Virgin River Chub. Implementing the Proposed Action would have no direct or indirect impact on riparian or aquatic habitats of the Virgin River on which these species depend.

Species of Concern and Other Sensitive Species. The Gila monster and chuckwalla likely occur in the project area, particularly in areas with rocky outcrops. Both species would be subjected to the same impacts described for desert tortoises. Impacts on migratory birds identified in *Section 3.5.1,Threatened, Endangered, and Sensitive Species,* including the FWS candidate species, the yellow-billed cuckoo, would be avoided as long as nests are not disturbed during the breeding season. No significant bat roosts are known to occur within or adjacent to the construction zones and, therefore, no impacts are anticipated. Also, plant species of concern were not present in area surveys and, therefore, no impacts are anticipated.

Pah Rah Parcel. No direct or indirect impacts to sensitive species, including sage grouse, are anticipated as a result of the land transfer. No new ground disturbing activities on the Pah Rah parcel are part of this aspect of the Proposed Action. Acquisition of the Pah Rah parcel would bring important wildlife habitat under BLM management, particularly for sage grouse.

4.5.1.1.2 Mitigation. Beyond the measures already identified, no mitigation is required. The project includes measures to protect desert tortoise and their habitat (see *Appendix A*). Measures have been established in the *Approved Caliente Management Framework Plan Amendment (APA)* and *Record of Decision (ROD) for the Management of Desert Tortoise Habitat* (BLM, 2000) and are applicable to this proposed project. These measures include the Terms and Conditions to implement the Reasonable and Prudent Measures in the FWS's Biological Opinion (BO) for the APA (FWS, 2000).

Of the eight Reasonable and Prudent Measures implemented to reduce the take of desert tortoises and their habitat, Numbers 5, 6, and 7 are applicable to this project. Also included are the Standard Operating Procedures (SOP) that were issued by BLM to aid in the recovery of the desert tortoise. These measures are consistent with those developed for the *Clark County Multiple Species HCP and EIS* (Clark County, 2000). For the Toquop Energy Project, permanent tortoise-proof fencing will be required for the access road from I-15 to the plant because the road is within an ACEC. *Appendix A* also includes stipulations to protect desert tortoise in the event that blasting is required. Measures to protect desert tortoise, in addition to those commitments contained in *Appendix A*, may be further developed during formal consultation with the FWS under Section 7 of the ESA and stipulated in the BO for this project.

Appendix B, Standard Construction and Operation Procedures, contains measures to prevent or minimize the potential for impacts on other special status species. Examples include consideration of bird breeding seasons, burrowing owls, bat roosts (if encountered), Gila monsters, and chuckwallas.

4.5.1.2 Alternative 1

4.5.1.2.1 Impacts. Because the project features, their operation, and associated actions under Alternative 1 would be the same or nearly the same as described for the Proposed Action, the impacts would also be similar. Because the water pipeline (eastern alignment) would only be 0.1 mile longer in this alternative, the area of ground disturbance and project rights-of-way would be 451 acres (182 acres of net new long-term disturbance following reclamation)—nearly the same as the amount of desert tortoise habitat affected under the Proposed Action (see Table 4-1). However, because the eastern water pipeline would run next to an existing road for 85 percent of its length, impacts from increased human activity during construction and maintenance would be relatively less than for the Proposed Action.

4.5.1.2.2 Mitigation. Protective measures would be the same as those described for the Proposed Action.

4.5.1.3 Alternative 2

4.5.1.3.1 Impacts. Because the project features, their operation, and associated actions for the power plant and wellfield for Alternative 2 would be the same or similar to those for the Proposed Action, the impacts would also be similar to those described for the Proposed Action. The location of the power plant adjacent to the wellfield in the Tule Desert under Alternative 2 would not increase the relative direct impacts from power plant construction. Eliminating the need for constructing a long water pipeline would greatly reduce direct and indirect impacts from construction and maintenance of this feature. However, construction of the 12.0-mile natural gas pipeline and electrical transmission line and the adjacent access road would greatly increase both direct and indirect impacts through increased ground disturbance and human activities from construction, operation, and maintenance of the project relative to the Proposed Action. The area of ground disturbance and project-related rights-of-way would total 581 acres of desert tortoise habitat under Alternative 2, including 44 acres of desert tortoise critical habitat in Lincoln County outside the Mormon Mesa ACEC construction

disturbance of 222 acres of desert tortoise critical habitat (see Table 4-1). This 581 acres would provide habitat for 10 desert tortoises. The net new long-term disturbance of 237 acres, following reclamation of disturbed sites (see Table 4-1), would provide habitat for four desert tortoises. The potential for increased predation by ravens on the desert tortoise as a result of new electrical transmission line would be much greater under Alternative 2 than the Proposed Action or Alternative 1. The new transmission line would provide new nesting and roosting sites for ravens in an area where few are currently available.

4.5.1.3.2 Mitigation. Protective measures would be the same as those described for the Proposed Action, but would need to be applied to the specific project features associated with Alternative 2.

4.5.1.4 Alternative 3

4.5.1.4.1 Impacts. Because the project features, their operation, and associated actions under Alternative 3 would be the same or nearly the same as described for the Proposed Action, the impacts would also be similar. Because of the smaller land requirement for the power plant site (80 acres) and ground water wells (up to 3 acres) under this alternative, the area of ground disturbance and project rights-of-way would be 417 acres (see Table 4-1). This would provide habitat for seven desert tortoises. The net new long-term disturbance of 150 acres (see Table 4-1), following reclamation of disturbed sites, would provide habitat for three desert tortoises.

4.5.1.4.2 Mitigation. Protective measures would be the same as those described for the Proposed Action.

4.5.1.5 No Action Alternative

Under the No Action Alternative, none of the direct or indirect impacts on threatened, endangered, or sensitive species described for the Proposed Action or alternatives would occur.

4.5.2 Vegetation and Noxious Weeds

4.5.2.1 Proposed Action

4.5.2.1.1 Impacts

Toquop Area. Direct impacts on vegetation would result from construction-related activities, and some indirect impacts would result from increased public access and project maintenance. Impacts on vegetation would result from direct removal, degradation caused by soil compaction, and increased erosion. Increased human activity associated with power plant construction, new road construction, and other project features would also impact vegetation by hindering revegetation in continually disturbed areas.

The Proposed Action would result in the disturbance or loss of 449 acres and associated vegetation. Following reclamation, the net new long-term disturbance would be 182 acres. Plants would be crushed during land-disturbing activities such as blading, grading, vehicular traffic, and trenching. Numerous species of cactus and yuccas are protected by state laws and occur throughout the project area. Several high-density areas of cactus and Joshua trees would be traversed by the water pipeline alignment between the proposed wellfield and the Toquop Gap, and between the Toquop Gap and the power plant site. Improved access to the

area may encourage greater OHV use and related impacts on vegetation.

The Proposed Action would increase the potential for the introduction and spread of noxious weeds on the project site. Noxious weeds identified in the project area include Russian thistle and, in the Toquop Gap, tamarisk. Because the isolated tamarisk stands in the Toquop Gap do not provide special wildlife habitat, they will be treated as any other species of noxious weed. Noxious weeds could spread via vehicles and soil disturbance activities during project development. However, the measures described in *Appendix B, Standard Construction and Operation Procedures*, include reclamation and BLM's standard weed control measures that would be effective in reducing the potential for spread of noxious weeds and their establishment in reclaimed areas. Through implementation of the Proposed Action, the Toquop parcel would no longer be under noxious weed management of the BLM and would fall under State of Nevada regulations. All other rights-of-way would remain under BLM weed management. All rights-of-way will be managed according to a BLM-approved integrated management plan.

Pah Rah Parcel. Native vegetation would benefit from BLM management practices if the land exchange were to occur. Long-term monitoring, regulated livestock grazing, and fire suppression are common BLM management practices that would enhance the condition of vegetation. Vegetation would be given added protection under BLM management. No other effects would be expected to occur on the Pah Rah parcel because land use would not change. No records of noxious weeds are associated with the Pah Rah parcel. The Proposed Action would not impact the potential for the introduction or spread of noxious weeds on the Pah Rah parcel.

4.5.2.1.2 Mitigation

Toquop Area. A temporary fencing plan for the pipeline right-of-way would be prepared and temporary fencing installed to protect restoration efforts as part of Measure 16 for protecting desert tortoise and their habitat (see *Appendix A*)

Pah Rah Parcel. No mitigation measures are proposed for the Pah Rah parcel.

4.5.2.2 Alternative 1

4.5.2.2.1 Impacts. Because the project features, their operation, and associated actions under Alternative 1 would be the same or nearly the same as described for the Proposed Action, the impacts would be similar. Because the water pipeline (eastern alignment) would only be 0.1 mile longer in this alternative, the area of ground disturbance and project rights-of way resulting in habitat loss would total 451 acres (net new long-term disturbance of 182 acres)—nearly the same as the Proposed Action. However, because the water pipeline would run next to an existing road for 85 percent of its length, the quality of the vegetation impacted would be relatively less than for the Proposed Action. This alternative pipeline route supports a lower density of cacti species and Joshua trees overall compared to the Proposed Action. Higher-density pockets of cacti and Joshua trees occur in some areas, such as the Summit Spring area. However, newly disturbed areas adjacent to existing roads are more susceptible to noxious weeds.

4.5.2.2.2 Mitigation. Mitigation measures would be the same as those described for the Proposed Action.

4.5.2.3 Alternative 2

4.5.2.3.1 Impacts. Because the project features, their operation, and associated actions for the power plant and wellfield would be the same or similar to those for the Proposed Action, the impacts on vegetation would also be similar to those described for the Proposed Action. The location of the power plant adjacent to the wellfield in the Tule Desert would not increase the relative direct impacts from power plant construction. Eliminating the need for constructing a long water pipeline would greatly reduce direct and indirect impacts from construction and maintenance of this feature. However, construction of the 12.0-mile natural gas pipeline and electrical transmission line and the adjacent access road to the power plant site would greatly increase ground disturbance and the subsequent loss of vegetation. The area of ground disturbance and project-related rights-of-way would total 581 acres under Alternative 2. Following reclamation, the net new long-term disturbance would be 237 acres.

4.5.2.3.2 Mitigation. A temporary fencing plan for the gas pipeline right-of-way would be prepared and temporary fencing installed to protect restoration efforts as part of Measure 16 for protecting desert tortoise and their habitat.

4.5.2.4 Alternative 3

4.5.2.4.1 Impacts. Because the project features, their operation, and associated actions under Alternative 3 would be the same or nearly the same as described for the Proposed Action, the impacts would be similar. Because of the smaller land requirement for the power plant site (80 acres) and ground water wells (up to 3 acres) under this alternative, the area of ground disturbance and project rights-of-way resulting in habitat loss would total 417 acres. Following reclamation, the net new long-term disturbance would be 150 acres.

4.5.2.4.2 Mitigation. Mitigation measures would be the same as those described for the Proposed Action.

4.5.2.5 No Action Alternative

Under the No Action Alternative, new impacts on vegetation would not occur. There would be less potential for noxious weeds being introduced to the project area.

4.5.3 Wild Horses and Burros

4.5.3.1 Proposed Action

4.5.3.1.1 Impacts

Toquop Area. No impacts on wild horses and burros would occur in the Toquop area as a result of the Proposed Action.

Pah Rah Parcel. The Pah Rah parcel would be managed by BLM as a "horse free" area in the existing Herd Area for wild horses and burros. No effects would be expected to occur because the current land use would not change.

4.5.3.1.2 Mitigation. No mitigation is required.

4.5.3.2 Alternative 1

Impacts on wild horses and burros for this alternative would be the same as those described for the Proposed Action. No impacts would be expected.

4.5.3.3 Alternative 2

Impacts on wild horses and burros for this alternative would be the same as those described for the Proposed Action. Fencing that will enclose the power plant and associated facilities on the northern Toquop parcel will prevent access by wild horses. No impacts would be expected.

4.5.3.4 Alternative 3

Impacts on wild horses and burros for this alternative would be the same as those described for the Proposed Action. No impacts would be expected.

4.5.3.5 No Action Alternative

No impacts on wild horses or burros would occur under the No Action Alternative.

4.5.4 Wildlife and Fisheries Resources

4.5.4.1 Proposed Action

4.5.4.1.1 Impacts

Toquop Area. Direct and indirect impacts on wildlife and wildlife habitat would result from implementing the Proposed Action. Direct impacts would result from ground disturbance during construction-related activities and project operation and maintenance that would total 449 acres. Following reclamation, the net new long-term disturbance would be 182 acres. Direct impacts would also occur from vehicle-wildlife conflicts during construction and operation. Desert bighorn sheep may be impacted by increased traffic on that portion of the access road between the proposed plant site and I-15 where it passes through a portion of the East Mormon foothills. Indirect impacts would result from increased public access and project maintenance. Habitat loss through the loss of vegetative cover would have an adverse effect on wildlife species dependent on vegetation for food or cover. In general, impacts on wildlife and wildlife habitat would be the same as those previously described in *Section 4.5.1* for threatened, endangered, and sensitive species of plants and wildlife.

Impacts on reptiles and small mammals would occur as a result of the ground disturbance associated with project construction, operation, and maintenance. Direct impacts to reptiles and small mammal species would include mortalites from construction activity and vehicular traffic. Reptile habitat would be destroyed as a result of earth moving activities, and direct mortalities may result from reptiles being crushed underground or run over by earth moving equipment. Some wildlife species would be temporarily displaced during construction activities.

During construction, dust and other construction-related disturbances may affect plants and wildlife. Construction may possibly fragment existing habitat use patterns, leading to a reduction in quality of habitat adjacent to new construction.

No direct or indirect impacts on aquatic habitat and fisheries of the Virgin River would result from ground water pumping for the Proposed Action. No short-term, adverse impacts from ground water pumping on the availability of water to wildlife are anticipated.

The evaporation pond for the Toquop power plant would be located in an area with few water sources. Especially because of this isolation, it may attract waterfowl, shorebirds, and other water

birds, thereby creating possible exposures of birds to highly saline water at the power plant. The ions in the pond water (for example, Na+, K+, Cl-, and SO_4-) are generally non-toxic and are not considered problematic to wildlife at normal environmental levels. However, concentrations of sodium (147,963 ppm) expected in the evaporation pond far exceed those associated with adverse effects in waterfowl; therefore, risk of mortality in waterfowl utilizing the pond is likely.

High levels of salinity, especially when coupled with low ambient temperatures (less than 4 degrees C), can result in salt encrustation on the feathers of waterfowl and other water birds. This encrustation of salt on the feathers results in the inability of the birds to fly to freshwater sources or continue migration, which may result in their death (possibly by drowning). Salt encrustation on waterfowl feathers and mortality were observed in several field studies (*Appendix E Salinity Effects on Birds*) and in another hypersaline wetland with electrical conductivity lower than that estimated for the evaporation pond. *Appendix E, Salinity Effects on Birds,* provides additional detail on the expected chemical make-up of water in the evaporation pond and possible effects on birds.

Pah Rah Parcel. No negative impacts on wildlife resources on the Pah Rah parcel, including pronghorn antelope and sage grouse, are anticipated from the land transfer. Acquisition of the Pah Rah parcel would bring important wildlife habitat under BLM management and would foster enhanced management by the BLM for sensitive wildlife species.

4.5.4.1.2 Mitigation. The evaporation pond will be monitored for water quality. Prior to when critical levels that could have adverse impacts on avian fauna are reached, active mitigation will be initiated. A number of mitigation techniques have been identified to keep water fowl and shore birds from entering the evaporation pond. Possible mitigation techniques that would be considered include electronic sound devices that mimic predatory bird calls, visual scare tactics, and propane noise cannons. These techniques have all been found to be successful under various conditions. Habituation can be a problem with some of these techniques. However, because the majority of water fowl and shore birds in the area will be present only during migratory flights, it is likely that the mitigation measures identified above will be effective. Once active mitigation is initiated, the effectiveness of the techniques used will be monitored. In the event the techniques listed above are not adequate to prevent most avian mortality, more advanced techniques, such as netting, may be employed.

4.5.4.2 Alternative 1

4.5.4.2.1 Impacts. Because the project features, their operation, and associated actions under Alternative 1 would be the same or nearly the same as those described for the Proposed Action, the impacts would be similar. A total of 451 acres would be disturbed during construction of project features. Net new long-term disturbance following reclamation would be 182 acres. The water pipeline (eastern alignment) would be 0.1 mile longer in this alternative than the Proposed Action. However, because the water pipeline would run next to an existing road for 85 percent of the line, relative impacts from increased human activity associated with construction and maintenance would be relatively less than for the Proposed Action.

4.5.4.2.2 Mitigation. Mitigation for Alternative 1 would be the same as for the Proposed Action.

4.5.4.3 Alternative 2

4.5.4.3.1 Impacts. Because the project features, their operation, and associated actions for the power plant and wellfield would be the same or similar to those for the Proposed Action, the impacts on wildlife also would be similar to those described for the Proposed Action. The location of the power plant adjacent to the wellfield in the Tule Desert would not increase the relative direct impacts from power plant construction. Eliminating the need for a long water pipeline would greatly reduce direct and indirect impacts from construction and maintenance of this feature. However, construction of the 12.0-mile natural gas pipeline and electrical transmission line and the adjacent access road would greatly increase direct and indirect impacts because of increased ground disturbance and human activities associated with construction, operation, and maintenance. The area that would be disturbed and/or included in construction-related rights-of-way would total 581 acres under Alternative 2. Following reclamation, the net new long-term disturbance would be 237 acres.

4.5.4.3.2 Mitigation. Mitigation for Alternative 2 would be the same as for the Proposed Action.

4.5.4.4 Alternative 3

4.5.4.4.1 Impacts. Because the project features, their operation, and associated actions under Alternative 3 would be the same or nearly the same as those described for the Proposed Action, the impacts on wildlife would be similar. The evaporation pond for Alternative 3 would be approximately 5 acres. A total of 417 acres would be disturbed during construction of project features. Net new long-term disturbance following reclamation would be 150 acres.

4.5.4.4.2 Mitigation. Mitigation for Alternative 3 would be the same as for the Proposed Action.

4.5.4.5 No Action Alternative

Under the No Action Alternative, impacts on wildlife resources would not occur.

4.5.5 Wetlands/Riparian Zones, Floodplains, and Waters of the United States

4.5.5.1 Proposed Action

4.5.5.1.1 Impacts

Toquop Area. The Proposed Action would not affect wetlands or riparian zones present at springs because these resources do not occur at the proposed sites of project features. Locations of springs in relation to project feature sites were discussed in *Section 4.4, Ground Water Resources*. The Proposed Action would affect a number of named and unnamed ephemeral washes. Named ephemeral washes that would be affected by the Proposed Action include Halfway Wash, Toquop Wash, South Fork Toquop Wash, and Sam's Camp Wash.

Jurisdictional delineations of waters of the United States were reviewed by Grady McNure of the USACE during a site visit/consultation on November 14, 2002. Table 1, *Appendix F*, presents a summary of the waters of the United States within

the Proposed Action and an estimate of impacts for the Proposed Action. Figures 4-1 through 4-3 present the approximate relative location of the larger washes within the Proposed Action. Because of the scale of the map and the small size of most of the ephemeral washes, many of the washes cannot be depicted on the figure.

The proposed access road would cross approximately 38 ephemeral washes, including Halfway Wash, that either intersect or parallel the proposed roadway. Construction in the bed or banks of the ephemeral washes would potentially cause minor, temporary increases in erosion, hydrologic changes, or vegetation removal that would reduce the ecological and functional values of the ephemeral wash. Waters of the United States affected by the roadway improvements are designated R-# within Table 1, *Appendix F*. As indicated in Table 1, *Appendix F*, the area affected at each of the 38 crossings of the waters of the United States is less than 0.5 acre.

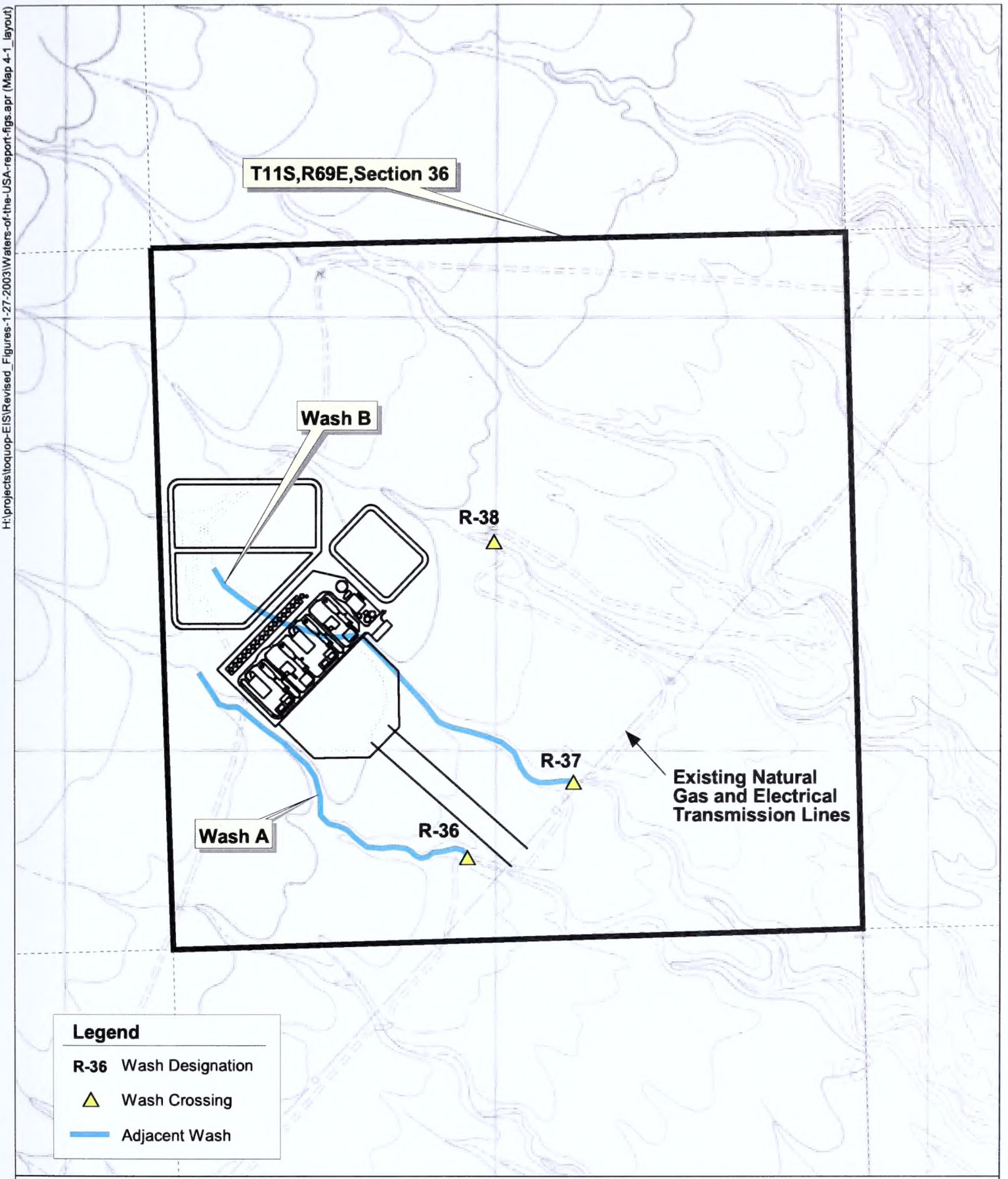
Two small ephemeral washes are located within or immediately adjacent to the footprint of the proposed plant site. These washes are approximately 8 feet wide and flow into Toquop Wash. As shown in Table 1, *Appendix F*, the area of the waters of the United States affected by the proposed plant would total approximately 0.3 acre.

The proposed water pipeline (western alignment) would affect ten ephemeral washes, including Toquop Wash, South Fork Toquop Wash, and Sam's Camp Wash. The proposed water pipeline would be located within and parallel to the streambed of the Toquop Wash within the Toquop Gap. The proposed pipeline would parallel the Toquop Wash for an estimated 2,000 feet. The pipeline alignment within Toquop Gap will be refined during the final engineering design phase to specifically minimize impacts to areas of riparian vegetation within the Gap. Impacts to waters of the United States associated with installation of the water pipeline would be temporary impacts, because the ground surface would be returned to pre-existing contours following completion of construction activities.

Floodplains are not expected to be affected by the Proposed Action because the area is mapped as "Zone D," which is defined as "areas of undetermined, but possible, flood hazards."

Based on a preliminary estimate of impacts to waters of the United States (See Appendix F, Tables 1, 2, and 3), the Nationwide Permit Program (NWP) probably cannot be utilized for the Proposed Action because the cumulative permanent impacts associated with the roadway improvements and the plant site would exceed the acreage loss of waters of the United States authorized by the individual NWPs for these activities (NWP 14—Linear Transportation Projects and NWP 39—Residential, Commercial and Institutional Developments).

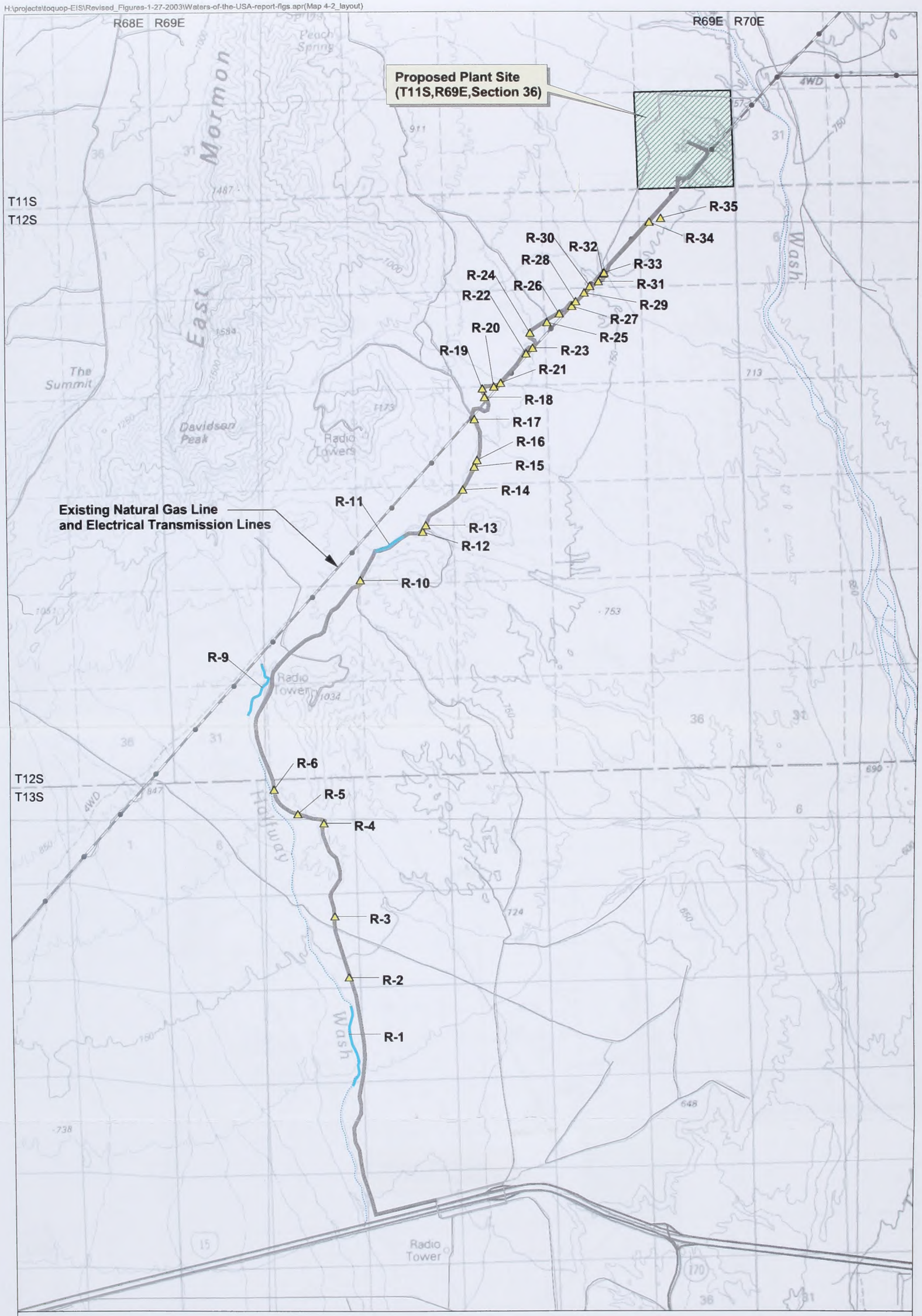
The Nevada Letter of Permission (LOP) procedures would be the applicable permit instrument for the Proposed Action. The Sacramento District of the USACE issues LOPs to authorize certain fill activities pursuant to Section 404 of the Clean Water Act that have overall minor impact to the aquatic ecosystem. Activities that qualify for processing through LOP procedures are fill activities that do not qualify for existing nationwide permit(s) or other general permit. These fill



Toquop Energy Project
Approximate Locations of Waters of the United States (Proposed Plant Site)

Map 4-1

CH2MHILL



Toquop Energy Project
Approximate Locations of Waters of the United States (Access Roadway Improvements)

Map 4-2

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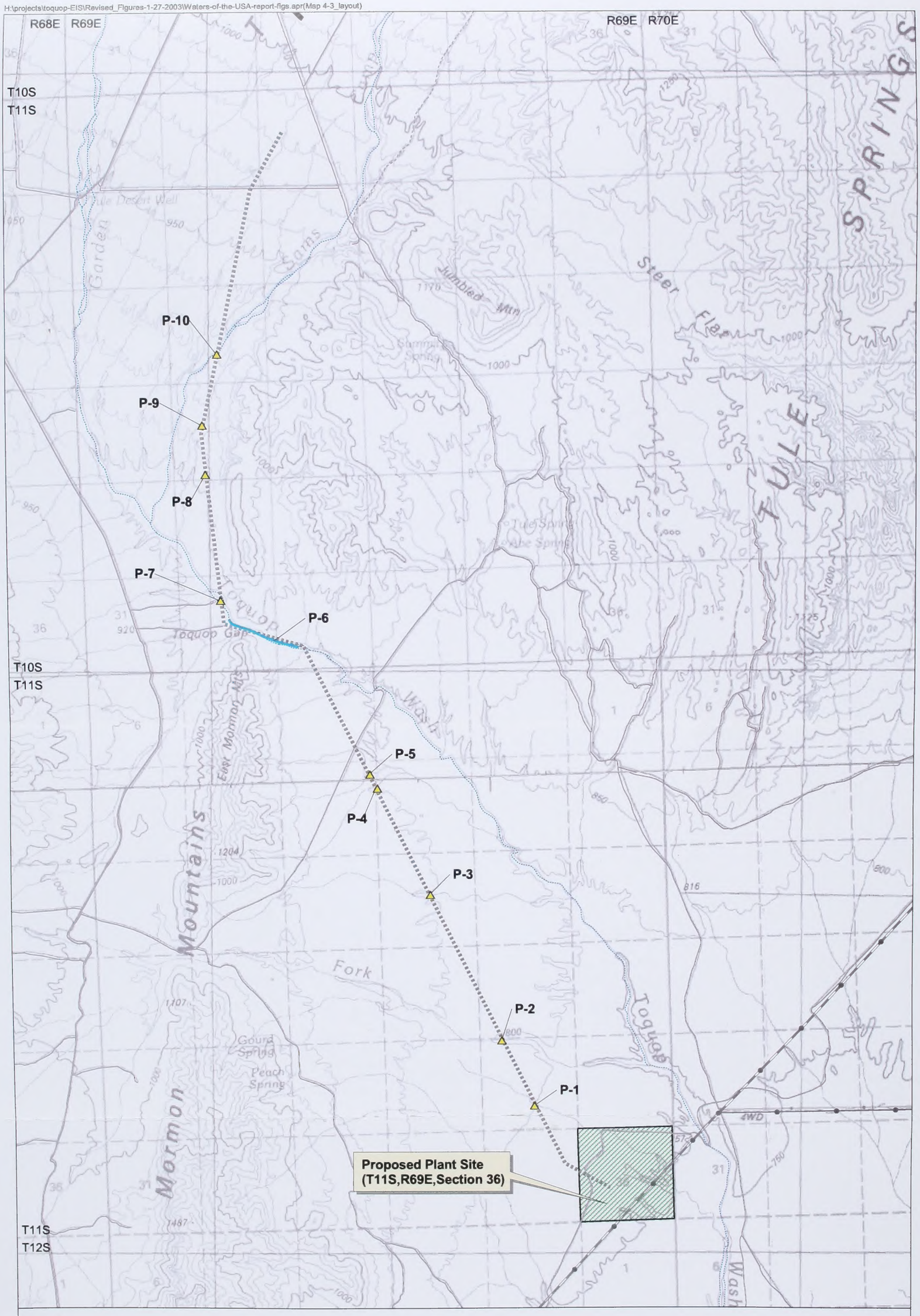

N

0 2500 5000 7500 Feet

Source:
Maptech 1:100,000 Scanned Topo Maps

Legend

P-1 Wash Designation

Wash Crossing

Adjacent Wash

Access Road

Toquop Energy Project
Approximate Locations of Waters of the United States (Proposed Pipeline)

Map 4-3

CH2MHILL

activities have minor impacts; and, therefore, do not warrant more detailed processing. The LOP is used only for those projects where the applicant performs a thorough pre-application coordination among the regulatory and resource agencies.

As requested by the USACE, a summary of the Proposed Action impacts evaluated according to the Section 404(b)1 Guidelines is presented in *Appendix F, Section 404(b)1 Guidelines for the Toquop Energy Facility,* of this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project.*

With the implementation of best management practices (BMPs) during construction, and other measures described in *Appendix B, Standard Construction and Operation Procedures,* and summarized below, impacts on waters of the United States, including ephemeral washes, would be minor.

Pah Rah Parcel. No perennial water bodies, waters of the United States, wetlands, other aquatic areas, or riparian vegetation are present within the Pah Rah parcel and, therefore, would not be affected by the Proposed Action.

4.5.5.1.2 Mitigation. No mitigation is required.

4.5.5.2 Alternative 1

4.5.5.2.1 Impacts. Alternative 1 would not affect wetlands or riparian zones present at springs. These resources do not occur at the immediate site of project features, although a number of springs are within approximately 100 yards of the eastern water pipeline alignment (see *Section 4.3, Surface Water Hydrology,* for discussion of spring locations). Alternative 1 would affect a number of named and unnamed ephemeral washes. Named ephemeral washes that would be affected include Halfway Wash, Toquop Wash, and Sam's Camp Wash.

As with the Proposed Action, the proposed access road would impact approximately 38 ephemeral washes, including Halfway Wash, that either intersect or parallel the proposed roadway. Two small ephemeral washes are located within the southern plant site. These washes are approximately 8 feet wide and flow into Toquop Wash.

The proposed water pipeline (eastern alignment) would affect approximately 54 ephemeral washes, including Toquop Wash and Sam's Camp Wash. The proposed pipeline would cross Toquop Wash below the confluence of Toquop Wash and South Fork Toquop Wash. Several drainages are present in the vicinity of the proposed crossing of the Toquop Wash.

Table 2, *Appendix F*, presents a summary of the Waters of the United States and an estimate of impacts associated with Alternative 1.

With the implementation of BMPs during construction and mitigation measures (see *Appendix B*), impacts on waters of the United States would be minor.

4.5.5.2.2 Mitigation. No mitigation is required.

4.5.5.3 Alternative 2

4.5.5.3.1 Impacts. Alternative 2 would not affect wetlands or riparian zones present at springs, although the utility corridor would pass near a number of springs, as described for the water pipeline

corridor in Alternative 1. Alternative 2 would affect a number of named and unnamed ephemeral washes. Named ephemeral washes that would be affected include Halfway Wash, Toquop Wash, and Sam's Camp Wash.

The proposed access road, which would extend from I-15 to the northern plant site, would impact approximately 92 ephemeral washes—including Halfway Wash, Toquop Wash, and Sam's Camp Wash—that either intersect or parallel the proposed roadway. Fifty-four of these ephemeral washes are the same as those that would be affected by the proposed water line and 38 are the same ephemeral washes that would be affected by the proposed road improvements described for the Proposed Action and Alternative 1. Based on a review of the USGS topographic maps, no ephemeral washes are present within the proposed plant site.

Table 3, *Appendix F*, presents a summary of the Waters of the United States and an estimate of impacts associated with Alternative 2.

The proposed utility alignment would affect approximately 54 ephemeral washes, including Toquop Wash and Sam's Camp Wash. These washes also would be affected by portions of the proposed access road. The proposed utility alignment would cross the Toquop Wash below the confluence of the Toquop Wash and the South Fork Toquop Wash. Several drainages are present in the vicinity of the proposed crossing of the Toquop Wash.

With the implementation of BMPs during construction and mitigation measures (see *Appendix B*), impacts on waters of the United States would be minor.

4.5.5.3.2 Mitigation. No mitigation is required.

4.5.5.4 Alternative 3

4.5.5.4.1 Impacts. Impacts of Alternative 3 would be the same as those described for the Proposed Action.

4.5.5.4.2 Mitigation. No mitigation is required.

4.5.5.5 No Action Alternative

Under the No Action Alternative, no impacts on wetlands or riparian zones, ephemeral washes, or floodplains would occur.

4.6 Air Quality and Noise

4.6.1 Air Quality

4.6.1.1 Proposed Action

4.6.1.1.1 Toquop Area

Overview

Construction. The Proposed Action would involve two distinct construction phases that have potential for impacts on air quality. The first is the construction of the pipeline that would supply water to the facility. The second is the construction of the power plant, including associated facilities such as the access road and substation. During construction, temporary and localized increases in ambient concentrations of NOx, CO, SO_2, VOCs, and PM10 would result from exhaust emissions of worker vehicles, heavy construction equipment, diesel generators, and other machinery and tools. In addition, fugitive dust emissions would result from excavation and earthwork.

For the duration of construction activities, actively disturbed areas would be stabilized through the use of wet suppression. Surfactants may be used to aid in wet suppression, thereby reducing the volume of water required to effectively treat the site. Disturbed areas of the site, including storage piles not being actively used for a period of 1 week or longer, would be stabilized as appropriate to minimize dust emissions. Active stabilization may not be required if soil moisture or natural crusting is sufficient to limit ambient impacts.

Bulk material stored onsite would be actively wetted during unloading as needed to minimize ambient impacts. It is anticipated that the majority of the material would be used onsite upon arrival. Should bulk materials require onsite storage for an extended period of time, the application of active wet suppression or the installation of a porous wind fence would be used as necessary to minimize fugitive dust generation.

Traffic passing from unpaved surfaces to paved roadways would create both mud and dirt deposits on the road and blowing dust from passing vehicles. Onsite equipment tire washing, for equipment that would leave the site and travel on paved roads, would be implemented as necessary to mitigate this potential source of fugitive dust.

Particulate emissions occur whenever a vehicle travels across an unpaved surface. Many of the heavily traveled unpaved surfaces, such as onsite access roads, would be covered with gravel and watered as necessary to minimize dust generation.

Onsite fugitive dust emissions would be limited by reducing vehicle speeds and a combination of active and passive dust suppression measures. Additional mitigation practices could include the following:

- Where practical, onsite employee parking, construction offices, and equipment and material laydown areas would be located near the main entrance to minimize onsite vehicle traffic.

- Onsite access roads, parking lots, and laydown areas would be maintained with a gravel cover to the maximum extent practical.

- Traffic off maintained onsite access roads would be restricted and a posted speed limit of 15 miles per hour would be enforced to minimize emissions from unpaved road segments.

- Unpaved road segments would be watered at least once daily when precipitation has not occurred. Additional watering of unpaved surfaces may be undertaken whenever it is necessary to prevent ambient impacts.

- Gaseous emissions from mobile sources would be minimized by proper maintenance and tune-up of equipment and by limitation of the equipment used to newer equipment, which meet air emission standards for emissions of gaseous pollutants.

For this study, a very conservative emission estimate was prepared using the emission factor for generalized construction activities from the California Air Resources Board (CARB) *Emission Inventory Procedural Manual* (CARB, 1997). This estimation methodology was accepted by NDEP BAQ. Controlled emissions based on this factor are 0.11 ton

per active acre per month of PM10 based on 8 hours per day of construction activities. This factor was scaled up to account for up to 9 hours per day of construction activity at the Toquop parcel.

The proposed power plant, switchyard, equalization and evaporation ponds, associated facilities, and a lay-down area would involve disturbance of approximately 100 acres. The access road and staging area would involve the disturbance of approximate 236 acres. Well, storage tank, and pipeline construction together with staging areas would add an additional 113 acres. Collectively, the total construction area to be disturbed is estimated to be 449 acres.

Based on an analysis of specific construction plans, it was estimated that a maximum of 35 percent of the plant area would be disturbed by activities on any given day. Additionally, it was estimated that the access road construction would cause soil disturbance in 1.5-mile sections (only 1.5 miles of the dirt access road would be disturbed at any one time before paving), that only one water well would be completed at any one time, and excavation and soil disturbance for the water pipeline would occur in 2-mile sections. The resultant maximum short-term PM10 emissions considering these factors would be 44.6 pounds per hour (lb/hr) from the power plant and evaporation pond area, 27.5 lb/hr from the wellfield and associated pipeline, and 10.4 lb/hr from the access road.

In addition to the fugitive dust emissions, during construction on-road and off-road vehicles would generate gaseous exhaust emissions. Mobile emissions are a function of hours of operation, vehicle speed, vehicle type, and fuel burned. Tables 4-2 and 4-3 summarize the total mobile emissions of CO, NOx, PM10, and SO_2 that would be generated during the construction phase.

Emission factors were obtained from CARB Emission Inventory for Off-Road Large Compression-Ignited (CI) Engines (greater than 25 horsepower), *Appendix D—Emission Factors for Off-Road Equipment*. January 2000 and EPA document AP-42, Volume II, Emission Factors for mobile Sources (EPA 1995, 5th edition and updates). This estimation methodology was accepted by NDEP BAQ.

TABLE 4-2
Emissions During the Construction Phase—Short-Term Rates
Proposed Action

	Particulate (PM10) (lb/hr)	Carbon Monoxide (lb/hr)	Sulfur Dioxide (lb/hr)	Nitrogen Oxides (lb/hr)
Power plant	45.72	7.39	5.90	39.23
Access road	11.78	9.87	9.07	13.91
Water pipeline	14.98	3.28	2.72	3.97
Wells	1.6	2.54	2.34	2.27

TABLE 4-3
Emissions During the Construction Phase—Total
Proposed Action

Phase of Construction	Carbon Monoxide (tons)	Nitrogen Oxides (tons)	Sulfur Dioxide (tons)	Particulate (PM10) (tons)
Power plant	16.7	73.0	10.6	303.5
Access road	3.5	19.0	3.2	61.3
Water pipeline	0.9	4.3	0.7	33.1
Wells	3.6	19.3	3.3	1.3
Project Totals	**24.7**	**115.7**	**17.8**	**399.3**

Operations

Air Emission Sources. The Proposed Action would include construction of a combined cycle, natural gas-fired water-cooled power plant. The plant would consume natural gas for the production of up to 1,100 MW of electricity.

The majority of the natural gas consumed by the plant would be fired in combustion turbines, which are similar to large jet engines. The hot exhaust gases would provide the energy to drive the turbine, which in turn would drive generators to produce electricity. Each combustion turbine/generator pair is referred to as a combustion turbine generator.

The waste heat in the turbine exhaust gas would be directed to a heat recovery steam generator to produce steam for the production of additional electricity. The heat recovery steam generator functions by passing the hot exhaust across a bank of metal tubes. Water inside of the tubes is thus heated by the exhaust to produce steam, which in turn drives another turbine, which in turn drives another generator to produce electricity. This turbine/generator pair is referred to as a steam turbine generator.

Heat recovery steam generators are often equipped with "duct burners," which are burners that combust additional fuel, further raising the temperature of the combustion turbine exhaust. The hotter exhaust is used to produce additional steam, allowing the steam turbine generator to produce additional electricity.

The proposed Toqoup facility would include four General Electric Frame 7FA combustion turbine generators. Each combustion turbine generator would be paired with one heat recovery steam generator equipped with 300 MMBtu/hr duct burners. Two heat recovery steam generators would be paired with each of two steam turbine generators; thus the steam from the four heat recovery steam generators would be delivered to two steam turbine generators. This arrangement is referred to as a "2x2x1" configuration, where there are two power blocks each consisting of two combustion turbine generators and one steam turbine generator. The Toquop combustion turbine generators and duct burners would be fired exclusively with natural gas.

Another configuration would change the facility to a "4x1x1" arrangement. In this arrangement, there would be four steam turbine generators, each of which would

be paired with one of the combustion turbine generators. No changes to the magnitude, type, or impact of air emissions would result from this modification.

The facility would also include two auxiliary boilers, which would be used to provide steam to preheat portions of the heat recovery steam generator and steam turbine generator. This auxiliary steam allows a faster and more efficient plant startup, and allows the heat recovery steam generator to be kept hot during brief maintenance outages. The Toqoup auxiliary boilers would be fired exclusively with natural gas.

Other sources of air emissions would result from equipment used to support the power plant. Four fuel preheaters (one per combustion turbine generator) with a rated heat input of 5 MMBTU would be used to re-vaporize any liquids that condense in the natural gas after the gas is reduced from pipeline pressure to burner pressure. Two diesel fired emergency generators would be used to provide power to protect critical equipment during plant outages in the event that grid power is also lost. A diesel-fired pump would be used to provide water for fire protection. Two cooling towers of eight to ten cells each would be used to provide cooling water to the surface water condensers.

The combustion turbine generators, duct burners, auxiliary boilers, generators, and fire pump would all cause air emissions of the criteria air pollutants nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), small particulate matter (PM10), and volatile organic compounds (VOCs). Minor quantities of hazardous air pollutants (HAPs) such as formaldehyde and benzene would also be emitted. The cooling towers will cause emissions of PM10.

Air Emission Controls. The facility would utilize a selective catalytic reduction (SCR) system for the control of NO_x emissions from the combustion turbine generators and duct burners. SCR technology uses ammonia, in the presence of catalyst, to react NO_x to elemental nitrogen (N_2). The SCR systems of the Proposed Action would be designed to control the combustion turbine generator/duct burner NO_x to 2.5 parts per million by volume, on a dry basis, corrected to 15 percent oxygen (ppmvd @ 15% O_2).

A small stoichiometric excess of ammonia must be added in order to control the NO_x to the target control concentration; this excess ammonia is then exhausted with the combustion turbine generator/duct burner exhaust and is referred to as "ammonia slip." When the SCR catalyst is new, ammonia slip is very small; ammonia slip from a new SCR system is typically less than 1 part per million by volume on a wet basis (ppmvw). After repeated use the catalyst loses reactivity, and additional stoichiometric excess of ammonia must be injected in order to meet the NO_x emission limits, resulting in additional ammonia slip. Eventually the catalyst is replaced, lowering ammonia slip to the original levels. For the Proposed Action, catalyst would be replaced when ammonia slip reaches 10 ppmvw.

The combustion turbine generators and other combustion sources would also use modern engineering and computer controls to minimize the emissions of other pollutants. After NO_x, CO is the other primary pollutant of concern from natural gas fired power plants; maximum CO emissions from Toquop combustion

turbine generators would be 10 ppmvd @ 15% O_2. The cooling towers would utilize highly efficient drift eliminators to minimize PM10 emissions.

Magnitude of Emissions. The emissions from the Toquop facility, and the use of air emission controls, would be regulated by various state and federal air pollution permits. In particular, the facility must apply for and obtain a permit under the Prevention of Significant Deterioration (PSD) program, which is required by the federal Clean Air Act but is administered in the State of Nevada by the Nevada Department of Environmental Protection.

The maximum emissions of criteria air pollutants from the facility, at the limits requested in the PSD permit application, are shown in Table 4-4. Emission data upon which these limits were based include turbine manufacturer's emission estimates, data from the USEPA "AP-42" document, and engineering experience from other plants. Toquop Energy Inc. would be required to verify compliance with these emission limits under the terms of the PSD air permit. Because federally enforceable limits on the emissions from the facility are being requested via the PSD permit, these rates also represent the potential to emit (PTE) of the facility.

Estimated maximum emissions of HAPs are shown in Table 4-5. These emissions were estimated based on source test data compiled in the CARB California Air Toxic Emission Factor (CATEF) database. The use of CATEF factors as a basis for estimating plant emissions was accepted by NDEP BAQ.

TABLE 4-4
Criteria Air Pollutant Potential Emissions for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3

Pollutant	Single Combustion Turbine Generator/ Duct Burners On	Fuel Preheater (per unit)	Auxiliary Boiler (per unit)	Cooling Tower (per cell)[a]	Emergency Fire Pump	Total Facility[b]
NO_x (lb/hr) [c]	19.19	0.25	1.40	—	3.91	108.5
NO_x (TPY) [d]	84.05	1.10	2.8	—	0.98	355.91
CO (lb/hr)	54	0.46	2.92	—	0.17	230.33
CO (TPY)	236.52	2.01	5.84	—	0.04	967.48
SO_2 (lb/hr)	11.44	0.03	0.24	—	0.39	47.57
SO_2 (TPY)	50.11	0.13	0.48	—	0.10	202.23
PM10 (lb/hr))	24.00	0.10	0.20	0.17	0.04	100.54
PM10 (TPY)	105.12	0.44	0.40	0.73	0.01	434.97
VOC (lb/hr)	4.22	0.24	0.16	—	0.13	19.37
VOC (TPY)	18.47	1.05	0.32	—	0.03	79.04

[a] Cooling tower emissions would be eliminated for Alternative 3.
[b] Includes emissions from four single combustion turbine generators and insignificant activities.
[c] Pounds per hour.
[d] Tons per year.

TABLE 4-5
Hazardous Air Pollutant Potential Emissions for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3

Pollutant	Potential to Emit (pounds/hour)*	Potential to Emit (tons/year)*
Benzene	0.61	2.62
Formaldehyde	0.80	3.47
1,3-Butadiene	0.0014	0.0036
Acetaldehyde	0.36	1.53
Acrolein	0.070	0.30
Ethylbenzene	0.061	0.27
Hexane	1.38	6.04
Naphthalene	0.0074	0.026
Propylene oxide	0.28	1.24
Toluene	0.38	1.63
Xylene (m,p)	0.27	1.18
Xylene (o)	0.14	0.59
Xylene (total)	0.13	0.53
Total Hazardous Air Pollutants	**4.50**	**19.4**

*Controlled emissions including insignificant/exempt activities.

Impacts

Construction. As discussed above, various control measures would be used to minimize impact of construction-related emissions. Because of these measures to prevent fugitive dust and the minimum vehicle emissions, the potential impacts resulting from construction activities at the proposed site would occur only over a limited geographic area and only for a limited time. After site preparation is complete, foundations have been constructed, and mitigation measures such as covering of traffic routes with gravel have been implemented, emissions would be very low. A Class II area impact analysis was completed, based on the emission rates described above and using the SCREEN3 dispersion model. This analysis demonstrates that federal and state ambient air quality standards would not be exceeded at any time during the construction phase. All predicted construction impacts are less than allowable standards. Modeled construction impacts for the power plant, access road, pipeline, and wellfield are presented and compared to ambient air quality standards in Tables 4-6 through 4-9. Pollutant concentrations in these tables and some subsequent tables are expressed as micrograms per cubic meter ($\mu g/m^3$).

TABLE 4-6
Estimated Reasonable but Conservative Impacts for Proposed Action Power Plant Construction

Pollutant	Maximum 1-Hour Predicted Impacts ($\mu g/m^3$)	Averaging Period	Scaling Factor	Maximum Predicted Impacts ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide	274.9	Annual	0.1	27.5	100
Carbon dioxide	51.8	8-hour	0.7	36.2	NA
		1-hour	1.0	51.8	NA
Sulfur dioxide	41.3	Annual	0.1	4.1	80
		24-hour	0.4	16.5	365
		3-hour	0.9	37.2	1,300
PM10*	320.3	Annual	0.1	41.0	50
		24-hour	0.4	138.3	150

*Maximum predicted PM10 impacts include background of 9 $\mu g/m^3$ (annual average) and 10.2 $\mu g/m^3$ (24-hour average)

TABLE 4-7
Estimated Reasonable but Conservative Impacts for Proposed Action Access Road Construction

Pollutant	Maximum 1-Hour Predicted Impacts ($\mu g/m^3$)	Averaging Period	Scaling Factor	Maximum Predicted Impacts ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide	144.3	Annual	0.1	14.4	100
Carbon dioxide	102.4	8-hour	0.7	71.7	NA
		1-hour	1.0	102.4	NA
Sulfur dioxide	94.1	Annual	0.1	9.4	80
		24-hour	0.4	37.6	365
		3-hour	0.9	84.7	1,300
PM10*	122.3	Annual	0.1	21.2	50
		24-hour	0.4	59.1	150

*Maximum predicted PM10 impacts include background of 9 $\mu g/m^3$ (annual average) and 10.2 $\mu g/m^3$ (24-hour average)

TABLE 4-8
Estimated Reasonable but Conservative Impacts for Proposed Action Water Pipeline Construction

Pollutant	Maximum 1-Hour Predicted Impacts ($\mu g/m^3$)	Averaging Period	Scaling Factor	Maximum Predicted Impacts ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide	67.5	Annual	0.1	6.8	100
Carbon dioxide	55.9	8-hour	0.7	39.1	NA
		1-hour	1.0	55.9	NA
Sulfur dioxide	46.3	Annual	0.1	4.6	80
		24-hour	0.4	18.5	365
		3-hour	0.9	41.7	1,300
PM10*	255.1	Annual	0.1	34.5	50
		24-hour	0.4	112.2	150

*Maximum predicted PM_{10} impacts include background of 9 $\mu g/m^3$ (annual average) and 10.2 $\mu g/m^3$ (24-hour average)

TABLE 4-9
Estimated Reasonable but Conservative Impacts for Proposed Action Well Site Construction

Pollutant	Maximum 1-Hour Predicted Impacts ($\mu g/m^3$)	Averaging Period	Scaling Factor	Maximum Predicted Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide	207.8	Annual	0.1	20.8	100
Carbon dioxide	231.7	8-hour	0.7	162.2	NA
		1-hour	1.0	231.7	NA
Sulfur dioxide	214.1	Annual	0.1	21.4	80
		24-hour	0.4	85.6	365
		3-hour	0.9	192.7	1,300
PM10*	146.6	Annual	0.1	23.7	50
		24-hour	0.4	68.8	150

*Maximum predicted PM_{10} impacts include background of 9 $\mu g/m^3$ (annual average) and 10.2 $\mu g/m^3$ (24-hour average)

Dispersion Modeling Methodology. Dispersion modeling was performed using EPA-approved air quality dispersion models, which are mathematical descriptions of atmospheric diffusion and dispersion processes that can be used to predict pollutant impacts over a given area. The modeling was conducted in accordance with a dispersion modeling protocol that was submitted to and approved by the NDEP BAQ as part of the PSD process. *Appendix G, Air Quality Dispersion Modeling Methodology,* describes the air quality dispersion modeling methodology in detail.

Class II Area Dispersion Modeling Results. Dispersion modeling of the maximum allowable emissions from the Toquop facility was performed for NO_X, CO, PM10, and SO_2. No EPA-approved models exist for prediction of ozone impacts of a single facility.

Predicted impacts are compared to the "PSD Increment," which is the maximum allowable ambient air quality deterioration allowed under the PSD program. They are also compared to the national ambient air quality standards (NAAQS). The NAAQS are the pollutant concentrations below which, as determined by the USEPA, no adverse human health or environmental impacts are presumed to occur. Nevada has specific state AAQS, but these generally match the federal standards.

Table 4-10 presents the predicted impacts from the Proposed Action and compares them to the PSD increment and NAAQS. The values presented represent the highest results modeled at any receptor location for any of the meteorological conditions modeled.

Class II Area HAPS. Ambient impacts of hazardous air pollutant emissions were estimated by prorating the ISCST3 and CTSCREEN modeling results for the criteria pollutants based on the ratios of HAP emission rate to criteria emission rate for each pollutant and each source. Reasonable but conservative resulting 8-hour, 24-hour, and annual average HAP concentrations are presented in Table 4-11. These estimated impacts were compared to available standards (state and federal human health exposure guidelines) based on the exposure duration.

The estimated 8-hour average HAP concentrations were compared to the 8-hour Nevada Average Acceptable Ambient Air Concentrations [AAACs] (ATSDR, 2002a; USEPA, 1997). The AAACs are from the National Air Toxics Inventory Clearing House database and are also presented in the toxicological profiles published by the Agency for Toxic Substances and Disease Registry (ATSDR). AAACs are available for 8 of the 12 HAPs.

The estimated 24-hour average HAP concentrations were compared to the ATSDR Minimal Risk Levels (MRLs) [ATSDR, 2002b]. MRLs were derived based on exposures that occur over a 1- to 14-day time frame and are available for 5 of the 12 HAPs.

The estimated annual average HAP concentrations were compared to the U.S. EPA Region 9 Ambient Air Preliminary Remediation Goals (PRGs) [USEPA, 2002]. The PRGs are based on a chronic (long-term) exposure and are derived using a target risk level of 1×10^{-6} (for carcinogens) or a target hazard index of 1 (non-carcinogens). PRGs are available for 10 of the 12 HAPs.

TABLE 4-10
Estimated Reasonable but Conservative Impacts for the Proposed Action

Pollutant	Averaging Period	Maximum Predicted Impacts	Ambient Impact Standards	
			PSD Increment ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide	Annual	12.6	25	100
Carbon dioxide	8-hour	51.7	NA	NA
	1-hour	406.6	NA	NA
Sulfur dioxide	Annual	0.9	20	80
	24-hour	4.5	91	365
	3-hour	21.8	512	1,300
PM10	Annual	2.1	17	50
	24-hour	9.4	30	150

As shown in Table 4-11, none of the estimated HAP concentrations exceed the available standards, based on the appropriate exposure term. Therefore, even if residences were located in close proximity to the site, it is very unlikely that the estimated HAP concentrations would result in an unacceptable risk to the occupants of those residences. The distance of the proposed Toquop facility from any residences or business makes this analysis even more conservative.

Although, none of the air standards presented in Table 4-11 are available for m,p-xylene and o-xylene, the potential impacts can be assessed using the standards for total xylenes, which is a mixture of m,p-xylene and o-xylene. In addition, Florida, Indiana, and North Dakota have 8-hour AAAC values for m,p-xylene and o-xylene ranging from 2,170 $\mu g/m^3$ to 4,400 $\mu g/m^3$ (USEPA, 1997); however, the estimated m,p-xylene and o-xylene average 8-hour air concentrations are nearly four orders of magnitude lower than these AAACs.

Class I Area Dispersion Modeling Analysis Results. Evaluation of air emission impacts on Federal Class I areas is focused on two primary topics. First, maximum ambient concentrations of criteria pollutants are estimated and compared to Class I area ambient air quality standards and Class I area allowable increment. Second, impacts of air emissions on Air Quality Related Values (AQRVs) within the Class I area are determined. In the western United States, AQRV evaluation is typically limited to evaluation of impacts on regional haze and AQRV impacts caused by acid deposition.

A CALPUFF screening model was used to predict impacts on the Grand Canyon National Park. National Weather Service meteorological data from Las Vegas were used for this analysis. This is the nearest existing set of data.

TABLE 4-11
Hazardous Air Pollutant Impact Analysis

	Reasonable but Conservative Estimated Impacts								
HAP	8-Hour Average Concentration ($\mu g/m^3$)	24-hour Average Concentration ($\mu g/m^3$)	Annual Average Concentration ($\mu g/m^3$)	Nevada Average Acceptable Ambient Air Concentrations [8-hour][1] ($\mu g/m^3$)	8-hour Average Concentration Greater than Nevada AACS?	ATSDR Minimal Risk Level (MRL) [acute, 1 - 14 days][2,4] ($\mu g/m^3$)	24-hour Average Concentration Greater than ATSDR MRL	Region 9 Ambient Air PRG [chronic][3] ($\mu g/m^3$)	24-hour Average Concentration Greater than Region 9 PRG?
Formaldehyde	4.9E-01	2.8E-01	7.0E-02	7.1E+01	No	3.3E+01	No	1.5E-01	No
1,3-Butadiene	2.7E-02	1.5E-02	3.9E.03	5.2E+04	No	NA[5]	—	3.7E-03	No
Acetaldehyde	5.2E-01	3.0E-01	7.5E-02	NA[5]	—	NA[5]	—	8.7E-01	No
Acrolein	4.4E-02	2.5E-02	6.3-03	6.9E+00	No	4.1E-02	No	2.1E-02	No
Ethylbenzene	6.3E-02	3.6E-02	9.0E-03	1.0E+04	No	8.1E+02	No	1.1E+03	No
Hexane	5.2E-01	2.9E-01	7.4E-02	4.3E+03	No	NA[5]	—	2.1E+02	No
Naphthalene	1.4E-02	8.0E-03	2.0E-03	1.2E +03	No	NA[5]	—	3.1E+00	No
Propylene oxide	1.1E-01	6.1E-02	1.5E-02	NA[5]	—	NA[5]	—	5.2E-01	No
Toluene	2.9E-01	1.6E-01	4.1E-02	8.9E+03	No	8.1E+02	No	4.0E+02	No
Xylene (m,p)	1.2E-01	6.9E-02	1.7E-02	NA[5]	—	NA[5]	—	NA[5]	—
Xylene (o)	1.1E-01	6.2E-02	1.5E-02	NA[5]	—-	NA[5]	—	NA[5]	—
Xylene (total)	2.2E-01	1.2E-01	3.1E-02	1.0E+04	No	8.1E+02	No	7.3E+02	No

Notes:

[1] ATSDR Toxicological Profile Information Sheets. http://www.atsdr.cdc.gov/toxpro2.html. March 2002.

[2] Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) for Hazardous Substances. http://www.atsdr.cdc.gov/mrls.html. March 2002.

[3] U.S. Environmental Protection Agency. Region 9 Ambient Air Preliminary Remediations Goals.

[4] ATSDR Minimal Risk Level for ethylbenzene is based on a sub-chronic (2 weeks to 1 year) exposure term.

[5] NA = value is not available for this HAP

Three additional Class I areas exist within 200 kilometers (125 miles) of the Proposed Action plant site. These are the Sycamore Canyon Wilderness Area, Bryce Canyon National Park, and Zion National Park. Because the distances to these areas are greater than the distance to the Grand Canyon National Park, the managers of these areas suggested that an analysis of potential impacts on the Grand Canyon National Park only would be adequate (Hall, 2001; Notar, 2001). Facility impacts on the Grand Canyon National Park should exceed impacts at the other three areas.

Table 4-12 lists the maximum predicted impacts on ambient pollutant concentrations within the Grand Canyon National Park. All predicted impacts are well below PSD Class I modeling significance levels; therefore, the Proposed Action is presumed to have an insignificant impact on air quality in the area and a cumulative evaluation of the impacts on increment and NAAQS was not performed.

The CALPUFF screening analysis predicted that the reasonable but conservative impact on regional haze within the Grand Canyon National Park was a 3.5 percent change in atmospheric light extinction. In accordance with the FLAG guidance document, a facility predicted to cause a change of 5 percent or less is presumed to have an insignificant impact on visibility. Therefore, a cumulative impact analysis of impacts on the Grand Canyon National Park was not performed. The subsequent complete CALPUFF analysis predicted that the reasonable but conservative impact on regional haze within the Grand Canyon National Park was a 1.6 percent change in atmospheric light extinction.

Reasonable but conservative modeling, based on CALPUFF screening analysis of the Proposed Action impact on acid deposition in the Grand Canyon National Park indicates that the added deposition would not exceed 1.3×10^{-3} kilograms per hectare per year (kg/ha/yr) for nitrogen compounds and 1.3×10^{-3} kg/ha/yr for sulfur. These results are significantly less than the deposition analysis thresholds of 5.0×10^{-3} kg/ha/yr for nitrogen recommended by the 2001 FLAG

TABLE 4-12
Predicted Grand Canyon National Park Impacts for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3

Parameter	Averaging Period	Maximum Predicted Impact at Grand Canyon ($\mu g/m^3$)	Class I Significance Level ($\mu g/m^3$)
Nitrogen oxides (NO_x)	Annual	0.0098	0.1
Sulfur dioxide (SO_2)	Annual	0.009	0.1
	24-hour	0.078	0.2
	3-hour	0.03	1.0
PM10	Annual	0.02	0.2
	24-hour	0.17	0.3

Guidance on Nitrogen Deposition Analysis Thresholds document and $5.0x10^{-3}$ kg/ha/yr for sulfur, as proposed but not yet finalized by the National Park Service (NPS). Because the estimated impacts of the Proposed Action were extremely low, the Proposed Action is presumed to create an minimal increase in the total deposition for the Grand Canyon National Park. Therefore, a more complete analysis of existing plus proposed deposition compared to the acid neutralization capacity of the Grand Canyon National Park waters was not performed.

Class II Area Visibility Impacts. As stated previously, the NPS requested an analysis of visibility impacts within the Lake Mead National Recreation Area (Notar, 2001). This included a CALPUFF analysis of impacts on regional haze and a VISCREEN analysis of discrete plume visibility impacts.

Regional Haze Impacts. The regional haze CALPUFF screening analysis predicted a reasonable but conservative 2.1 percent change in atmospheric light extinction resulting from the Proposed Action. Because this is well below the 5 percent threshold recommended in the FLAG document, no cumulative impact analysis of Lake Mead National Recreation Area regional haze was performed.

Discrete Plume Impacts. VISCREEN is a relatively simplistic Gaussian distribution model that assumes all plant emissions would form a single plume. On this basis, the four combustion turbine generator/duct burner stacks and the 16 cooling tower cells of the Proposed Action were modeled as a single plume blowing straight towards Lake Mead.

For the purpose of determining the reasonable but conservative meteorology to be used in determining discrete plume impacts, the VISCREEN guidance manual specifies that the user determine the most stable meteorological conditions occurring for at least 1 percent of the year.

For the Proposed Action, based on the Las Vegas meteorological data set used for the CALPUFF analysis, this reasonable but conservative meteorology was determined to be a "D" class stability and a 4 m/s windspeed. These data were used for the VISCREEN analysis.

No published standards exist for evaluation of discrete plume visual impacts in federal Class II areas. For federal Class I areas, the VISCREEN users' manual suggests maximum allowable color contrast ("delta E") of 2.0 for results viewed against terrain or sky, maximum allowable contrast of 0.5 for results viewed against sky, and maximum allowable contrast of 0.6 for results viewed against terrain.

For the Proposed Action, the model predicts that the reasonable but conservative color contrast and contrast, viewed against sky, would be 0.25 and -0.008, respectively, for situations where the observer is viewing the plume with the sun behind the observer, and 1.5 and 0.031, respectively, for situations where the observer is viewing the plume with the sun behind the plume. These results are well within the standards for Class I areas. The model predicts reasonable but conservative color contrast and contrast, viewed against terrain, of 0.083 and 0.01, respectively, with the sun behind the observer, and 2.3 and 0.015, respectively, with the sun behind the plume.

The model predicts that, under the right atmospheric conditions and with specific

relative angles between the observer, the plume, and the sun, the total Proposed Action plant emissions merging to form a single plume could be viewed against terrain at Lake Mead National Recreation Area. Predicted results are well within Class I area standards for all other situations.

These conditions could occur, at most, for 1 percent of the year. Less than 1 percent of the Lake Mead National Recreation Area is within the radius where these results were predicted. Furthermore, at the specified angles of sun, observer, and terrain, no elevated terrain against which the observer could view the plume exists. Therefore, VISCREEN predicts minimal impact on visibility within the Lake Mead National Recreation Area.

4.6.1.1.2 Pah Rah Parcel. No adverse air quality impacts on the Pah Rah parcel would occur as a result of the land exchange. Converting the Pah Rah parcel to public administration would reduce development potential on the parcel and the potential for related contributions to airborne emissions.

4.6.1.1.3 Mitigation. No mitigation is required.

4.6.1.2 Alternative 1

4.6.1.2.1 Impacts. Predicted impacts from Alternative 1 would be the same as those estimated for the Proposed Action.

4.6.1.2.2 Mitigation. No mitigation is required.

4.6.1.3 Alternative 2

4.6.1.3.1 Impacts

Construction. Predicted construction-related impacts from Alternative 2 would be essentially equal in all respects to those estimated for the Proposed Action. With a plant site location in the Tule Desert, Alternative 2 would require a much shorter water pipeline; however, a new transmission line the same length as the pipeline would be required. Thus, overall Alternative 2 would have impacts of equal magnitude to the Proposed Action, although the maximum impacts could occur in slightly different locations.

Operation

Class II Area Impacts. Alternative 2 is in an area of similar topography, climate, and meteorology as the Proposed Action. Maximum PM10 and SO_2 impacts from the Proposed Action were predicted to be in the East Mormon Mountains at an elevation of approximately 125 meters (410 feet) above and at a distance of 4 to 5 miles from the plant site. For Alternative 2, Jumbled Mountain reaches 243 meters (797 feet) above the plant site, begins rising above the desert at a distance of about 1 mile, and reaches its summit approximately 2 miles from the plant site. Therefore, especially given the use of the screening meteorological data set which weights all wind directions equally, it is highly likely that the predicted maximum PM10 and SO_2 impacts for Alternative 2 would be equal to or greater than the predicted maximum PM10 and SO_2 impacts for the Proposed Action.

For the Proposed Action, the highest predicted NO_x impact was between the plant site and the East Mormon Mountains. Because this impact occurred

on relatively level topography, it is unlikely that the maximum predicted NO_x impact for Alternative 2 would be any less than that for the Proposed Action. However, there is a chance that, given the closer proximity of mountains for Alternative 2, the predicted NO_x impacts for Alternative 2 could be higher than for the Proposed Action.

Class I Area Impacts. The Alternative 2 plant site would be 99 kilometers (62 miles) from the closest point of the Grand Canyon National Park, versus 78 kilometers (49 miles) for the Proposed Action plant site. Climate and meteorology of the two sites would be similar. Jumbled Mountain and the Tule Springs Hills are between the Alternative 2 plant site and the Grand Canyon National Park, providing complex terrain that may promote additional mixing or divert winds that may have blown from the plant site to the Grand Canyon National Park area.

It can, therefore, be assumed that the potential impacts of Alternative 2 on all pollutant concentrations within the Grand Canyon National Park would be less than Class I modeling significance levels, that Alternative 2 would cause less than the 3.5 percent change in atmospheric light extinction in the Grand Canyon National Park predicted for the Proposed Action, and that no unacceptable acid deposition within the park would occur.

Class II Area Visibility Impacts. An analysis of discrete plume visual impacts for Alternative 2 was not conducted. However the Alternative 2 plant site would be approximately 62 km (39 miles) from the Lake Mead National Recreation Area. There are no USEPA-approved discrete plume visual impact models that are valid for distances greater than 50 km (31 miles). Therefore, it would be impossible to conduct a similar analysis for Alternative 2, and the plant would be presumed to create no discrete plume visual impacts on the Lake Mead National Recreation Area.

Alternative 2 is 24 km (15 miles) further from the Lake Mead National Recreation Area than the Proposed Action. It is therefore assumed that a CALPUFF analysis of Alternative 2 impacts on Lake Mead National Recreation Area regional haze would demonstrate a worst-case impact of less than 2.1 percent change in atmospheric light extinction, and that Alternative 2 would also be demonstrated to have minimal impacts at the Lake Mead National Recreation Area.

4.6.1.3.2 Mitigation. No mitigation is required

4.6.1.4 Alternative 3

The air emissions resulting from Alternative 3 would be very similar to those of the Proposed Action. The only changes in air emissions would be the elimination of the small PM10 emissions from the cooling towers. Emissions from the combustion turbine generators, duct burners, auxiliary boilers, emergency generators, and fire water pumps would be identical to those of the Proposed Action.

Because of the stack downwash, slight variations in near-field ambient impacts could result. Downwash is the phenomena whereby the action of wind blowing past buildings and other structures nearby the stacks creates vortexes that can pull exhaust below the tip of the stack, thus creating changes to near-field impacts. Alternative 3 would add the large air-cooled condenser structures to the project,

and would likely cause rearrangement of other structures, thus changing downwash.

4.6.1.4.1 Impacts. Ambient impacts associated with Alternative 3 are anticipated to be very similar to those of the Proposed Action. Because of stack downwash, which is caused by small vortexes created when wind passes the structures surrounding the exhaust stacks, variations in ambient impacts may result from Alternative 3 as compared to the Proposed Action because the plant layout would change for Alternative 3. Furthermore, cooling towers create small levels of PM10 air pollution; very fine droplets of water are blown out the top of the tower, and the salts naturally present in the water droplet form crystals when the water itself evaporates after the droplet leaves the tower. Alternative 3 would eliminate this small source of particulate air pollution and thus would cause a small reduction in ambient impacts. Any ambient impact variations caused by either issue would be very minor and would be confined to the area immediately surrounding the project site.

4.6.1.4.2 Mitigation

No mitigation is required.

4.6.1.5 No Action Alternative

No new sources of air pollutant emissions would be added under the No Action Alternative. Therefore, no air quality impacts would result, and existing conditions described for the affected environment in Chapter 3 would continue.

4.6.2 Noise

This analysis addresses the potential temporary noise impacts from project construction activities, and the potential noise impacts from project operation and maintenance activities.

4.6.2.1 Proposed Action

4.6.2.1.1 Impacts

Toquop Area. Construction of the Proposed Action would result in a temporary (26-month) direct increase in ambient noise levels at the southern Toquop power plant site, along the access road to the site, at the wellfield, and along the western water pipeline alignment. The actual increase in ambient noise levels at any given location would depend on the construction activity occurring and the number and mix of construction vehicles and equipment in use.

Construction of a power plant can generally be divided into five phases that use different types of construction equipment. The five phases are: 1) site preparation and excavation; 2) concrete pouring; 3) steel erection; 4) mechanical; and 5) clean-up. Construction equipment generates both constant and impulse noise, depending on the type of equipment. Noise levels generated by construction equipment generally range from 85 to 98 dBA at 50 feet (CH2M HILL, 2001), and would vary, depending on the construction activity. Some blasting is anticipated during construction. The increased noise level (approximately 105 dBA at a distance of 1,000 feet) would have a duration of less than 2 seconds (CH2M HILL, 1994). These construction noise levels would be temporary, and noise levels at the source would not exceed 110 dBA. No sensitive receptors would be exposed to the noise. Lincoln County's Zoning Ordinance does not include a noise ordinance (Lincoln County, 2001b).

The greatest source of noise from operation of the Proposed Action would be the combustion turbine generators. Operation of the proposed power plant is expected to emit noise levels of approximately 60 dBA at approximately 550 feet over open land. No noise ordinances exist in Lincoln County, and no sensitive receptors would be exposed to the noise.

Pah Rah Parcel. Because no development would occur at the Pah Rah parcel as a result of implementing the Proposed Action, no change in ambient noise levels is expected.

4.6.2.1.2 Mitigation. No mitigation is required.

4.6.2.2 Alternative 1

4.6.2.2.1 Impacts. Construction impacts associated with Alternative 1 would be the same as those described for the Proposed Action because the same power plant would be constructed on the same parcel as described for the Proposed Action. In addition, a water pipeline similar to that described for the Proposed Action would be installed (eastern alignment instead of western alignment), and a wellfield and an improved access road similar to those described for the Proposed Action would be constructed under Alternative 1. Further, construction noise levels would be temporary and would not exceed 110 dBA. No sensitive receptors would be exposed to the noise. Lincoln County's Zoning Ordinance does not include a noise ordinance (Lincoln County, 2001b). Operation noise levels would be the same as described for the Proposed Action.

4.6.2.2.2 Mitigation. No mitigation is required.

4.6.2.3 Alternative 2

4.6.2.3.1 Impacts. Construction impacts associated with Alternative 2 would be the same as those described for the Proposed Action. Although the power plant would be constructed on the northern parcel instead of the southern parcel, the same noise-generating activities would be performed during plant construction. In addition, a gas pipeline following an alignment similar to the water pipeline alignment described for the Proposed Action would be installed. An overhead high-voltage electric transmission line also would be installed, and a wellfield and improvements to the access road similar to those described for the Proposed Action would be constructed under this alternative. Construction of these project components would emit noise levels similar to those expected from constructing the Proposed Action. Construction noise levels would be temporary and not exceed 110 dBA. No sensitive receptors would be exposed to the noise. Lincoln County's Zoning Ordinance does not include a noise ordinance (Lincoln County, 2001b). Operation noise levels would be the same as described for the Proposed Action.

4.6.2.3.2 Mitigation. No mitigation is required.

4.6.2.4 Alternative 3

4.6.2.4.1 Impacts. Although this alternative would consist of an air-cooled power plant instead of a water-cooled system, the same noise-generating activities would be performed during plant construction as those described for the Proposed Action, so construction impacts associated with Alternative 3 would be the

same as those described for the Proposed Action.

A 4-inch-diameter water pipeline (smaller than for the Proposed Action) and fewer deep wells (up to 3 for Alternative 3 rather than up to 15 for the Proposed Action) would be installed. In addition, the same gas and transmission line connections and improvements to the access road as are planned for the Proposed Action would be completed for Alternative 3. Construction of these project components would emit noise levels similar to those expected from constructing the Proposed Action. Construction noise levels would be temporary and not exceed 110 dBA. No sensitive receptors would be exposed to the noise. Lincoln County's Zoning Ordinance does not include a noise ordinance (Lincoln County, 2001b). The greatest source of noise from Alternative 3 would be the fans on the air-cooled condensers. Noise would also be generated by the combustion turbine generators to a lesser extent. Noise levels produced from operation of Alternative 3 would be higher than were described for the Proposed Action, but no sensitive receptors would be exposed to the noise.

4.6.2.4.2 Mitigation. No mitigation is required.

4.6.2.5 No Action Alternative

Trends and future conditions associated with noise in the Toquop and Pah Rah areas under the No Action Alternative are expected to be the same as existing conditions. Therefore, no impact on ambient noise levels would be expected with implementation of this alternative. Development may occur in the future in these areas, but the level and type of development and associated noise levels that would occur in these areas is unknown.

4.7 Visual Resources

This analysis addresses the potential temporary impacts on visual resources from project construction activities and the potential long-term impacts on visual resources from the presence of the proposed facilities.

4.7.1 Proposed Action

4.7.1.1 Impacts

4.7.1.1.1 Toquop Area. The visual impacts from constructing and operating the Toquop Energy Project under the Proposed Action would depend on the degree of change to the visual resource and the viewers' responses to that change. Impacts on visual resources during project construction would include the following:

- **Dust that would be generated.** Dust would be generated by earth-moving activities, construction vehicles and equipment, construction worker vehicles, materials delivery vehicles, and from areas within the construction zone that have been disturbed or where excavated material is stockpiled. Fugitive dust, if emitted in sufficient quantities and if adverse weather conditions persist, could impair or degrade existing views.

- **Presence of the construction equipment.** Depending on their values, interests, and preconceived notions and expectations, for some recreationists viewing the area, the presence of the construction equipment and its associated activities would detract from the views currently

experienced. For other recreationists, the presence of the equipment and the construction activities would be interesting and would add visual variety to the landscape.

- **Increased light emitted from construction areas if nighttime construction is conducted.** Depending on their values and expectations, recreationists may not like the visual intrusion caused by construction night lighting.

Visual impacts associated with the power plant would be limited to the plant site within the Toquop parcel. Changes to the landscape would be both short- and long-term. Construction duration would be approximately 26 months.

Visual impacts associated with the water pipeline would be limited to the project construction phase. During the construction period, an alignment area would be temporarily disrupted by machinery, excavated piles of dirt, trenches, construction vehicles and workers, and other disturbances associated with pipeline construction. However, these effects would be located in a remote area and would be temporary. Following construction, the pipeline would be buried and the surface would be restored to its original condition and grade. Therefore, no long-term changes would occur to the visual environment.

Existing visible nighttime lighting of other facilities in the region is minimal. The proposed power plant would require nighttime lighting for operational safety and security. It would create a new source of nighttime light, substantially increasing the amount of light emitted from the project site.

Levels of daytime glare at the project site are not expected to be affected because consultation with Lincoln County and the BLM would occur to determine the appropriate colors for project features. Colors would be selected that are anticipated to blend with the surrounding landscape to the extent feasible.

The southern power plant is expected to be visible from the Mormon Mountains WSA from an area due west of the southern plant site. Depending on how clear the day is, it is likely that the proposed plant would be visible from ridges in the Mormon Mountains WSA. However, at a distance of approximately 5.5 miles, individual project features would not likely be discernible. If there is a water vapor plume (likely to occur only on cool, moist early mornings, dissipating as the temperature increases and humidity decreases), it would likely be visible from the mountains. Although the plant is expected to be visible from this WSA, the plant's presence is not expected to detract from the recreationists' experience in the WSA.

Upgrading the existing southernmost 5 miles of access road (from I-15 north to the Clark County/Lincoln County boundary) would meet the objective of the BLM VRM Class III designation of that land. This is further discussed in *Appendix H, Bureau of Land Management Visual Contrast Rating Worksheet*. The analysis concludes that upgrading the frontage road and dirt road, as part of the Proposed Action, would result in a Form, Color, and Texture contrast rating of Weak, and a Line contrast rating of Weak to Moderate. The appendix includes a Visual Contrast Rating Worksheet prepared for the proposed upgraded roadway, in accordance with BLM protocols. In support of the worksheet,

photographs of the proposed access road (existing condition) were taken from a Key Observation Point (KOP) using a 35-millimeter single lens reflex camera and a 50-millimeter lens. KOPs are usually considered sensitive viewing locations; however, because no sensitive viewers/viewing locations exist in the project vicinity, this KOP was selected because of the visibility of the proposed access road from I-15. The KOP location where the photograph was taken and the direction the camera was focused are shown in *Appendix H, Figure 1*. *Appendix G, Figure 2a,* shows the existing view. *Appendix H, Figure 2b,* shows a simulation of the proposed access road prepared from the KOP.

Implementation of the Proposed Action (power plant, transmission line, water pipeline, natural gas connection, wellfield, and upgrades to the existing road from the Clark County/Lincoln County boundary north to the two project sites) is consistent with the BLM VRM Class IV designation of that land.

The proposed land exchange (Pah Rah parcel) is consistent with the BLM VRM Classes III and IV designations of that parcel.

4.7.1.1.2 Pah Rah Parcel. No impacts on visual resources from implementing the proposed land exchange would occur because no development or onsite activities would occur at the Pah Rah parcel as a result of the transaction.

4.7.1.2 Mitigation

No mitigation is required.

4.7.2 Alternative 1

4.7.2.1 Impacts

Construction impacts associated with Alternative 1 would be similar to those described for the Proposed Action. Impacts on visual resources from operation of Alternative 1 and from the presence of project features associated with this alternative would also be similar to those described for the Proposed Action. An easterly water pipeline alignment associated with this alternative (as opposed to a westerly alignment with the Proposed Action) would not result in a substantive difference in visual impacts from this alternative, when compared to the Proposed Action. This is because the pipeline is an underground project feature, resulting in short-term impacts to the landscape occurring during the project construction period, and minimal, if any, long-term changes to the landscape expected.

4.7.2.2 Mitigation

No mitigation is required.

4.7.3 Alternative 2

4.7.3.1 Impacts

Construction impacts associated with Alternative 2 would be similar to those described for the Proposed Action. The impact described for the Proposed Action relative to the water pipeline would not be applicable to this alternative. However, a similar impact is expected from construction of the natural gas pipeline that is part of Alternative 2. Impacts on visual resources from operation of Alternative 2 would also be similar to those described for the Proposed Action.

Visual impacts from the presence of project features associated with Alternative 2 would be similar in type, but of greater magnitude, than those described for the Proposed Action. This is because this alternative involves development of the power plant at the northern site rather than the southern site (as was the case for the Proposed Action). Siting the plant at the northern location requires other necessary changes to the landscape including a longer access road than was needed for the Proposed Action, an easterly gas pipeline alignment (not needed for the Proposed Action), and an easterly overhead electrical transmission line alignment (also not needed for the Proposed Action). A water pipeline (that was needed for the Proposed Action) would not be needed as part of this alternative.

Development of the power plant at the northern site, with implementation of Alternative 2, would locate the power plant features approximately 12 miles north-northwest of the southern plant site. This would result in it being even more obscured from view from I-15 and farther away from receptors than with the Proposed Action, resulting in fewer visual impacts from this project feature. The northern power plant would, however, be visible to recreationists in the Mormon Mountains and Clover Mountain WSAs and possibly from the Meadow Valley Range WSA. Its presence, however, would not detract from the recreationists' experience. Therefore, impacts on visual resources from the power plant would be similar to those described for the Proposed Action.

This alternative would result in an additional 12.2 miles of roadway that would be constructed, when compared to the Proposed Action. However, this additional landscape change would not be noticeable from I-15 because only the southernmost 0.4 mile of project access roadway that is oriented north-south is visible from I-15 (similar to what is seen with the Proposed Action). It is possible that the paved roadway would be visible to recreationists in the Mormon Mountains and Clover Mountain WSAs and possibly the Meadow Valley Range WSA; however, the presence of the roadway would not detract from the recreationists' experience. Therefore, impacts on visual resources from the roadway element of this alternative would be similar to those described for the Proposed Action.

A gas pipeline along an easterly alignment, which was not needed as part of the Proposed Action, would not result in a substantive difference in visual impacts by this alternative, when compared to the Proposed Action. This is because the pipeline is an underground project feature, resulting in short-term impacts to the landscape occurring during the project construction period, and minimal, if any, long-term changes to the landscape expected.

An overhead electrical transmission line also was not needed as part of the Proposed Action. The addition of transmission line towers to the area would result in a visual change to the landscape; however, the towers would be approximately 12 to 22 miles north of I-15 so their visibility from I-15 would be minimal. It is possible that they would be visible to recreationists in the Mormon Mountains WSA; however, the presence of the towers would not detract from the recreationists' experience. Also, because there is already an existing transmission line in the area, the transmission line that is proposed as part of this alternative

would be in character with those existing landscape modifications.

4.7.3.2 Mitigation

No mitigation is required.

4.7.4 Alternative 3

4.7.4.1 Impacts

Construction impacts of the power plant, western utility alignment, and access road associated with Alternative 3 would be similar to those described for the Proposed Action. In addition, impacts associated with operation of Alternative 3 relative to lighting and glare would be similar to those described for the Proposed Action. Because an air-cooled plant would be constructed as part of this alternative, no water vapor plumes are expected to occur.

Alternative 3 would result in a smaller amount of landscape being disturbed than the Proposed Action because the Alternative 3 footprint would require less land (80 acres versus 100 acres required for the Proposed Action). Alternative 3 would have more (and a different type of) condensers, no cooling towers, a smaller evaporation pond, a smaller equalization pond, and fewer deep wells in the wellfield than the Proposed Action. These differences in design would result in landscape changes that are similar to, but not the same as the Proposed Action. The primary differences in landscape changes with this alternative, when compared with the Proposed Action, are the air-cooled condensers because they are the power plant feature having the greatest mass. Partially offsetting that greater visual change (due to the larger structures) are the fewer number of wells that would be required and the smaller evaporation and equalization ponds that would be needed for this alternative.

Although this alternative design is different from that of the Proposed Action and Alternatives 1 and 2, its overall visual impact to the landscape from its physical presence would be similar to that of the Proposed Action. Similar to the Proposed Action, it is not expected to be visible from I-15 because of its distance from the freeway (approximately 12 miles). It is, however, expected to be visible to recreationists in the Mormon Mountains WSA from an area due west of the southern plant site, depending on how clear the day is. However, at a distance of approximately 5.5 miles, individual project features may not be clearly discernible. Although the plant associated with Alternative 3 is expected to be visible from this WSA, the plant's presence is not expected to detract from the recreationists' experience in the WSA.

4.7.4.2 Mitigation

No mitigation is required.

4.7.5 No Action Alternative

If the areas adjacent to or near the Toquop and Pah Rah parcels are developed, or as traffic levels increase on I-80 or I-15 in the future, views from and toward those parcels would change. Not implementing the project (the No Action Alternative) would result in no visual change to the landscape of the Toquop and Pah Rah parcels, if no other development on those parcels occurs.

4.8 Recreation Resources

This analysis addresses the potential impacts on recreation resources from development of the project.

4.8.1 Proposed Action

4.8.1.1 Impacts

4.8.1.1.1 Toquop Area. Transferring ownership of the 640-acre Toquop parcel from public to private would preclude the continuation of existing recreational opportunities on the 100-acre fenced portion of the parcel. However, this effect would not be substantive because recreation is mainly casual use in nature, including wildflower and bird viewing in spring, primitive camping, and OHV driving for pleasure. Careful well siting would minimize potential future conflicts between the OHV users and the aboveground production wells. Some hunting (primarily to the west in the East Mormon Mountains foothills) also occurs in the area. These opportunities would still be available on lands adjacent to the parcel. Implementation of the Proposed Action would not create a demand for recreation opportunities in the Toquop area, but it would provide improved access for individuals who wish to pursue recreation opportunities nearby.

4.6.1.1.2. Pah Rah Parcel. The proposed Pah Rah land exchange would have no adverse effect on existing recreation opportunities in the Pah Rah area. Transferring ownership from private to public would make the Pah Rah parcel available for public recreation, thus providing additional opportunities for recreation to occur.

4.8.1.2 Mitigation

No mitigation is required.

4.8.2 Alternative 1

4.8.2.1 Impacts

Effects of this alternative on recreational opportunities in the Toquop area would be the same as the effects described for the Proposed Action.

4.8.2.2 Mitigation

No mitigation is required.

4.8.3 Alternative 2

4.8.3.1 Impacts

Effects of this alternative on recreational opportunities in the Toquop area are expected to be the same as the effects described for the Proposed Action.

4.8.3.2 Mitigation

No mitigation is required.

4.8.4 Alternative 3

4.8.4.1 Impacts

Effects of this alternative on recreational opportunities in the Toquop area would be the same as the effects described for the Proposed Action. The one exception is that the potential for future use conflicts between OHV users and the aboveground production wells in the Tule Desert wellfield area is less with Alternative 3 than with the Proposed Action because the production wells associated with this alternative would be limited to 3 acres of land (rather than 15 acres for the Proposed Action, and Alternatives 1 and 2).

4.8.4.2 Mitigation

No mitigation is required.

4.8.5 No Action Alternative

Trends and future conditions associated with recreation in the Toquop area and Pah Rah parcel under the No Action Alternative are expected to be the same as existing conditions. Therefore, no impact on recreation resources is expected with implementation of this alternative. Development may occur in the future in these areas, which would likely increase the population, and consequently, the demand for recreation opportunities and facilities in those areas. The level and type of development, and associated recreation demand that may occur, are unknown.

4.9 Land Use, Prime or Unique Farmlands, and Rangelands

This analysis addresses the potential land use conflicts from developing the proposed project.

4.9.1 Proposed Action

4.9.1.1 Impacts

4.9.1.1.1 Toquop Area. Because the land adjacent to the southern Toquop parcel is primarily undeveloped, with some power production facilities located nearby, implementation of the Proposed Action would not be incompatible with existing adjacent land uses.

Because the Toquop area is not considered prime or unique farmland, no impacts on those land types would occur.

The southern Toquop parcel, which lies within the Gourd Spring Allotment, was removed from livestock management after the construction of the Gourd Spring ACEC fence. No AUMs would be lost from the exchange of this parcel. The well sites, monitoring well, and storage tank would remove up to 17 acres from current livestock use. A portion of the White Rock, Garden Springs, Summit Spring, and Snow Spring allotments may be affected, depending on the location of the well sites. The removal of these areas would not affect the management of livestock within these allotments. The water line would temporarily disturb up to 90 acres of rangeland that is currently being managed for livestock use. This disturbance would be reclaimed but would temporarily reduce the amount of available forage within the Garden Springs and Gourd Spring allotments. Because of the SOPs (see *Appendix B*) that would be followed for the installation of the water line, there would be no impact to the management of livestock. Existing range improvements would be encountered during the construction of the wells and water lines; however, SOPs would be followed in the construction of the wells and water lines to eliminate impacts.

4.9.1.1.2 Pah Rah Parcel. Because the Pah Rah parcel is not considered prime or unique farmland, no impacts on those land types would occur.

Transfer of the Pah Rah parcel, which lies within the Olinghouse Grazing Allotment with 696 AUMs, into the public domain may facilitate grazing because the BLM would be able to integrate the management of this parcel with other adjacent public lands.

After this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* is completed (which would identify lands as

being available for disposal) and the Pah Rah/Toquop land exchange occurs, development of the Proposed Action would require obtaining a variance or special use permit to allow development of a non-agricultural facility in an agricultural-zoned area. In addition, ROWs/easements and coordination with others (relative to grazing issues) to develop the power plant and associated infrastructure would be required.

4.9.1.2 Mitigation

No mitigation is required beyond the fence proposed in *Section 4.5.2, Vegetation and Noxious Weeds.*

4.9.2 Alternative 1

4.9.2.1 Impacts

Because the land adjacent to the southern Toquop parcel is primarily undeveloped, with some nearby power production facilities, implementation of Alternative 1 would not be incompatible with existing adjacent land uses and would be the same as described for the Proposed Action.

Because the Toquop parcel is not considered prime or unique farmland, no impacts on those land types would occur. Effects on livestock management would be the same as described for the Proposed Action.

Development of Alternative 1 would require obtaining a variance or special use permit to allow development of a non-agricultural facility in an agricultural-zoned area. In addition, ROWs/easements and coordination with others (relative to grazing issues) to develop the power plant and associated infrastructure would be required, the same as what would be required to develop the Proposed Action. These development requirements are not considered impacts.

4.9.2.2 Mitigation

No mitigation is required beyond the fence proposed in *Section 4.5.2, Vegetation and Noxious Weeds.*

4.9.3 Alternative 2

4.9.3.1 Impacts

Because the land adjacent to the northern Toquop parcel is primarily undeveloped, with some power production facilities located nearby, implementation of Alternative 2 would not be incompatible with existing adjacent land uses and would be the same as described for the Proposed Action.

Because the Toquop parcel is not considered prime or unique farmland, no impacts on those land types would occur. Effects on livestock management within the wellfield and rights-of-way would be similar to those described for the Proposed Action. The Toquop parcel would remove 640 acres of rangeland (located within the 38,823-acre Garden Springs Allotment) that is currently being managed for 2,809 AUMs of livestock use, and it would affect existing range improvements located on and surrounding the parcel. Removal of 640 acres could result in a reduction of permitted grazing use of 46 AUMs on the Garden Springs allotment.

Development of Alternative 2 would require obtaining a variance or special use permit to allow development of a non-agricultural facility in an agricultural-zoned area. In addition, ROWs/easements and coordination with others (relative to grazing issues) to develop the power plant

and associated infrastructure would be required, the same as what would be required to develop the Proposed Action.

4.9.3.2 Mitigation

No mitigation is required beyond the fence proposed in *Section 4.5.2, Vegetation and Noxious Weeds.*

4.9.4 Alternative 3

4.9.4.1 Impacts

Because the land adjacent to the southern Toquop parcel is primarily undeveloped, with some nearby power production facilities, implementation of Alternative 3 would not be incompatible with existing adjacent land uses and would be the same as described for the Proposed Action.

Because the Toquop parcel is not considered prime or unique farmland, no impacts on those land types would occur. Effects on livestock management would be the same as described for the Proposed Action.

Development of Alternative 3 would require obtaining a variance or special use permit to allow development of a non-agricultural facility in an agricultural-zoned area. In addition, ROWs/easements and coordination with others (relative to grazing issues) to develop the power plant and associated infrastructure would be required, the same as what would be required to develop the Proposed Action. These development requirements are not considered impacts.

4.9.4.2 Mitigation

No mitigation is required beyond the fence proposed in *Section 4.5.2, Vegetation and Noxious Weeds.*

4.9.5 No Action Alternative

Trends and future conditions associated with land use in the Toquop area and Pah Rah parcel under the No Action Alternative are expected to be the same as existing conditions. Therefore, no conflicts with land use are expected with implementation of this alternative. Development may occur in the future in these areas; however the level and type of future development is uncertain. Such development is expected to either be in accordance with the areas' land planning documents, or may require variances, permits, easements, ROWs, or other coordination with individual landowners. These potential development requirements are not considered impacts.

4.10 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers

This analysis addresses the potential impacts on Wilderness Areas, WSAs, Areas of Critical Environmental Concern (ACECs), and Wild and Scenic Rivers.

4.10.1 Proposed Action

4.10.1.1 Impacts

4.10.1.1.1 Toquop Parcel. Because the Toquop parcels are not within designated Wilderness Areas, WSAs, ACECs, or along a Wild and Scenic River, no impacts would occur. The potential wellfield abuts the Mormon Mountains WSA. Therefore, management prescriptions for those special management areas would not apply to any of the proposed project features, except for the proposed access road between I-15 and the southern Toquop

parcel, which would cross the Mormon Mesa ACEC.

The proposed access road is an existing dirt road and would require improvement to construct and operate the Proposed Action in both the Lincoln and Clark County portions. Improvements would include road widening to 24 feet, straightening in certain locations, and paving the entire 14.4-mile length of the road. This would potentially affect 216 acres (137 acres in Lincoln County and 79 acres in Clark County) of previously undisturbed lands contained in the construction right-of-way and 20 acres of staging areas in Lincoln County. All of the staging areas and the Clark County portion of the access road are in the Mormon Mesa ACEC, while 123 acres of the previously undisturbed 137 acres in Lincoln County are in the Mormon Mesa ACEC. Following reclamation, the net new long-term disturbance would be 65 acres (42 acres in Lincoln County and 23 acres in Clark County). This ACEC is a desert tortoise Special Management Area (SMA).

The ACEC is a ROW avoidance area in both Lincoln and Clark Counties. However, this is an upgrade to an existing road and will meet ACEC requirements in Lincoln County according to stipulations contained in the Caliente MFP that call for the use of existing roads for construction in ACECs and the avoidance of areas outside of corridors within ACECs. The project would also conform with the Las Vegas RMP, as follows: RW-1-e identifies desert tortoise ACECs as right-of-way avoidance areas. Therefore, ACI a/2a applies to any new or change to an existing RW and states "Manage each area based on the specific resource constraints identified in Tables 2-2 through 2-6." Table 2-2 is specifically directed at resource constraints for the desert tortoise ACECs covered by the Las Vegas RMP, which include the Mormon Mesa ACEC. Table 2-2 states that the following resource constraints apply to roads in ACECs: "Require reclamation of temporary roads. Authorize new roads in response to specific Proposed Actions where no feasible alternative exists. Ensure access to private property." Therefore, the improvement of the existing graveled access road to the proposed power plant site would be in conformance with the Las Vegas RMP.

4.10.1.1.2 Pah Rah Parcel. Because the Pah Rah parcel is not located within designated Wilderness Areas, WSAs, ACECs, or along a Wild and Scenic River, no impacts would occur.

4.10.1.2 Mitigation

No mitigation is required.

4.10.2 Alternative 1

4.10.2.1 Impacts

Implementation of Alternative 1 would not result in impacts on Wilderness Areas, WSAs, or Wild and Scenic Rivers, the same as the Proposed Action.

Alternative 1 would use the same access road across the Mormon Mesa ACEC as the Proposed Action.

4.10.2.2 Mitigation

No mitigation is required.

4.10.3 Alternative 2

4.10.3.1 Impacts

Implementation of Alternative 2 would not result in any impacts on Wilderness Areas, WSAs, or Wild and Scenic Rivers, the same as the Proposed Action.

Alternative 2 would use the same access road across the Mormon Mesa ACEC as the Proposed Action.

4.10.3.2 Mitigation

No mitigation is required.

4.10.4 Alternative 3

4.10.4.1 Impacts

Implementation of Alternative 3 would not result in impacts on Wilderness Areas, WSAs, or Wild and Scenic Rivers, the same as the Proposed Action.

Alternative 3 would use the same access road across the Mormon Mesa ACEC as the Proposed Action.

4.10.4.2 Mitigation

No mitigation is required.

4.10.5 No Action Alternative

Under the No Action Alternative, the existing access road to the transmission line would continue to be located within the Mormon Mesa ACEC.

4.11 Wastes, Hazardous and Solid

This analysis addresses the potential impacts from solid and hazardous waste generation, transport, and disposal for the Proposed Action and alternatives during project construction, operation, and maintenance activities.

4.11.1 Proposed Action

4.11.1.1 Impacts

4.11.1.1.1 Toquop Area. Based on the environmental controls outlined in the standard construction and operation procedures contained in *Appendix B, Standard Construction and Operation Procedures*, there should be no environmental impacts. A Spill Prevention Control and Countermeasures Plan (SPCCP), outlined in *Appendix B,* would provide procedures for cleaning up any future spill or release.

4.11.1.1.2 Pah Rah Parcel. No environmental impacts would result from the Proposed Action.

4.11.1.2 Mitigation

No mitigation is required.

4.11.2 Alternative 1

4.11.2.1 Impacts

There should be no hazardous or solid waste impacts associated with Alternative 1 for the same reasons as described for the Proposed Action.

4.11.2.2 Mitigation

No mitigation is required

4.11.3 Alternative 2

4.11.3.1 Impacts

No potential hazardous or solid waste impacts should be associated with Alternative 2 for the same reasons as described for the Proposed Action.

4.11.3.2 Mitigation

No mitigation is required.

4.11.4 Alternative 3

4.11.4.1 Impacts

There should be no hazardous or solid waste impacts associated with Alternative 3 for the same reasons as described for the Proposed Action.

4.11.4.2 Mitigation

No mitigation is required

4.11.5 No Action Alternative

If the areas near the Toquop and Pah Rah parcels are developed in the future, the potential for releases of hazardous or solid wastes associated with development and increased human activity (traffic, etc.) could increase. However, implementation of the No Action Alternative would not contribute to a hazardous or solid waste impact in the Toquop area or at the Pah Rah parcel.

4.12 Cultural and Historical Resources and Native American Religious Concerns

This section addresses potential impacts to cultural resources. Project-related impacts to resources eligible for the NRHP will be managed in accordance with the *Cultural Resources Programmatic Agreement* (*Appendix C*) between the BLM and Nevada SHPO for the Toquop Energy Project. This Programmatic Agreement (PA) contains stipulations to ensure that historic and prehistoric properties eligible for the NRHP will be treated to avoid or mitigate project-related effects to the extent practicable and to satisfy BLM's Section 106 responsibilities.

4.12.1 Proposed Action

4.12.1.1 Impacts

4.12.1.1.1 Toquop Area. Ten archaeological sites (eight prehistoric, two historic) and two isolated artifacts could be affected by construction or by change of ownership resulting from the proposed land exchange. All of these cultural resources are ineligible for the NRHP. Indirect impacts could potentially result from greater human activity in the area and possibly increased OHV use.

The BLM initiated consultation with several Southern Paiute tribes concerning both the initial land exchange proposal as well as the ensuing Toquop Energy Project. Several responding tribes made a site visit, and concerns were raised about possible effects to the Salt Song Trail, a property of traditional cultural or religious importance. Subsequently, among those tribes expressing initial concerns, one tribe indicated that this property does not extend into the project area, and another tribe indicated it has no concerns with the Proposed Action or its alternatives. Otherwise, BLM determined it had not received enough information about this property's location or its current use to assess possible project-related effects in relation to expressed concerns. No tribe

has responded to BLM's request for more specific information about this property's location or possible effects on religious practitioners. Additional information on consultation is provided in *Section 5.3.2, Native American Consultation.*

4.12.1.1.2 Pah Rah Parcel. The land exchange would not threaten the cultural resources found in the Pah Rah parcel. Transfer of this parcel to public ownership may help ensure long-term protection/stewardship of cultural resources on the parcel. As summarized by Burke (2001):

"The proposed land exchange poses no known effects to the integrity of these cultural resources; the only result would be to move these cultural resources into a different management milieu involving various federal laws and regulations rather than local and state regulations which may now apply. No other activity or undertaking is known or anticipated at this time that has the potential to affect the integrity of these resources. No further action is recommended in relation to the proposed land exchange itself."

Burke (2001) also notes that the "BLM received no formal responses from Indian tribes following a written BLM notice of the exchange proposal and a request for information about resources of concern or interest to the tribes in the area or for any expressions of concern for the proposal generally."

4.12.1.2 Mitigation

Beyond the Programmatic Agreement with SHPO, no mitigation is required. No special consideration is necessary for ineligible cultural resources sites or isolated artifacts. The Proposed Action can therefore proceed with no requirements for avoidance or mitigation of known historic properties.

The potential exists for buried cultural resources not visible on the surface survey, although the geomorphic context of the Proposed Action makes the presence of any such sites unlikely. This low probability of buried deposits precludes the need of archaeological monitors during construction.

Because only a records review has been conducted for the wellfield area, all well locations and associated new access routes must be subjected to a Class III survey prior to any construction, in accordance with terms of the PA.

The PA provides specific procedures for handling discoveries during construction. The BLM will ensure that any human remains, grave goods, items of cultural patrimony, and sacred objects encountered during the undertaking are treated with the respect due such materials. In accordance with the terms of the PA, human remains and associated grave goods found on public land will be handled according to the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations (43 CFR 10).

4.12.2 Alternative 1

4.12.2.1 Impacts

Twelve archaeological sites (eight prehistoric, two historic, two with both prehistoric and historic components) and nine isolated artifacts could be affected by construction or by change of ownership resulting from the proposed land exchange. One site is eligible for NRHP status, the rest are ineligible. All isolates are ineligible. Indirect impacts could poten-

tially result from greater human activity in the area and possibly increased OHV use.

Issues regarding Native American concerns are the same as those for the Proposed Action.

4.12.2.2 Mitigation

For ineligible sites, mitigation for Alternative 1 would be the same as described for the Proposed Action. Regarding the one NRHP eligible site, further clarification is necessary. While located within the right-of-way, the site is approximately 30 feet above the roadbed in rock outcrop. It is unlikely that project-related activities will affect this area. Thus, no special mitigation measures are necessary at this time, but a professional archaeologist must be present to monitor construction activities near the site.

4.12.3 Alternative 2

4.12.3.1 Impacts

Six archaeological sites (two prehistoric, two historic, two with both prehistoric and historic components) and ten isolated artifacts could be affected by construction or by change of ownership resulting from the proposed land exchange. One site is eligible for NRHP status, the rest are ineligible. All isolates are ineligible. Indirect impacts could potentially result from greater human activity in the area and possibly increased OHV use.

Issues regarding Native American concerns are the same as for the Proposed Action and Alternative 1.

4.12.3.2 Mitigation

Mitigation for Alternative 2 would be the same as that described for Alternative 1.

4.12.4 Alternative 3

4.12.4.1 Impacts

Ten archaeological sites (eight prehistoric and two historic) and two isolated artifacts could be affected by construction or by change of ownership resulting from the proposed land exchange. All of these cultural resources are ineligible for the NRHP. Indirect impacts could potentially result from greater human activity in the area and possibly increased OHV use.

Issues regarding Native American concerns are the same as those for the Proposed Action.

4.12.4.2 Mitigation

Mitigation for Alternative 3 would be the same as described for the Proposed Action.

4.12.5 No Action Alternative

The Pah Rah parcel would remain in private ownership. There are no local, state, or other non-federal laws or regulation affecting how a non-federal action would take into account possible effects on cultural resources, leaving them in the same unprotected status they now have.

4.13 Indian Trust Assets

4.13.1 Proposed Action and Action Alternative

4.13.1.1 Toquop Area

Indian Trust assets (ITAs) are legal interests in assets held in trust by the federal government for Indian tribes or individuals. The Department of the Interior Order No. 3175 requires all its bureaus and offices to explicitly address

anticipated effects on ITAs in planning, decision, and operation documents.

No impacts on Indian Trust assets would occur. There are no Indian Trust assets in the project area for the Proposed Action, Alternative 1, Alternative 2, or Alternative 3.

4.13.1.2 Pah Rah Parcel

There are no Indian Trust assets on the Pah Rah parcel.

4.13.2 No Action Alternative

The No Action Alternative would not affect Indian Trust assets.

4.14 Environmental Justice

Executive Order 12898 requires an analysis of a potential disproportional effects of a project on minority and low-income populations. This analysis addresses the potential impacts on minority and low-income populations in the Clark, Lincoln, and Washoe county areas.

4.14.1 Proposed Action

4.14.1.1 Impacts

Implementation of the Proposed Action would not result in any property takings from minority or low-income populations.

4.14.1.1.1 Toquop Area. No health hazard impacts would be created for minority or low-income populations in Clark or Lincoln County as a result of implementation of the Proposed Action. In addition, no hazardous waste impacts on minority or low-income populations in the two counties are expected from implementation of the Proposed Action.

Adverse economic impacts are not expected to accrue to Clark or Lincoln County. Therefore, no adverse economic impacts on minority or low-income populations would occur.

Implementation of the Proposed Action would not require the relocation of any people. Therefore, no relocations of minority or low-income populations would occur.

4.14.1.1.2 Pah Rah Parcel. No health hazard impacts, hazardous waste impacts, or adverse economic impacts would accrue to minority or low-income populations in Washoe County. No relocations would be required.

4.14.1.2 Mitigation

No mitigation is required.

4.14.2 Alternative 1

4.14.2.1 Impacts

Implementation of Alternative 1 would not result in any impacts on minority or low-income populations, the same as the Proposed Action.

4.14.2.2 Mitigation

No mitigation is required.

4.14.3 Alternative 2

4.14.3.1 Impacts

Implementation of Alternative 2 would not result in any impacts on minority or low-income populations, the same as the Proposed Action.

4.14.3.2 Mitigation

No mitigation is required.

4.14.4 Alternative 3

4.14.4.1 Impacts

Implementation of Alternative 3 would not result in any impacts on minority or low-income populations, the same as the Proposed Action.

4.14.4.2 Mitigation

No mitigation is required.

4.14.5 No Action Alternative

Trends and future conditions associated with the Toquop and Pah Rah areas under the No Action Alternative are expected to be the same as existing conditions. Therefore, no impact on minority or low-income populations is expected with implementation of this alternative.

4.15 Paleontological Resources

4.15.1 Proposed Action and Alternatives

4.15.1.1 Toquop Area

Surface evaluation of the Proposed Action and its alternatives resulted in no paleontological resources.

4.15.1.2 Pah Rah Parcel

The Pah Rah parcel contains no fossil-bearing geology. There would be no impacts on paleontological resources in the Pah Rah parcel.

4.15.2 No Action Alternative

The No Action Alternative would have no effect on paleontological resources.

4.16 Socioeconomics

This section presents the potential effects of the Proposed Action and alternatives on the social and economic conditions in Clark, Lincoln, and Washoe counties.

Input-output analysis was used to determine the economic impacts of project construction and operation on the combined regional economy of Lincoln and Clark counties. These two counties are assumed to be the pertinent region of influence for the economic impacts of the construction and operation of the Proposed Action and alternatives. A set of regional input-output multipliers was generated for the two-county region using the 1998 IMPLAN data set. *Appendix I* describes the modeling procedures and assumptions used in the analysis of the regional impacts estimated for the Proposed Action and alternatives.

The estimated project costs for construction and operation, used in the analysis, was provided by Toquop Energy. These costs were analyzed to estimate the effects on other industries in the two-county region of influence.

4.16.1 Proposed Action

4.16.1.1 Impacts

4.16.1.1.1 Toquop Area

Economic Impacts of Construction

The total estimated construction cost of the Proposed Action is approximately

$695 million, of which $175 million would remain in the region of influence. The total annual estimated labor cost during construction is $34 million, all of which would be spent within the region of influence. This construction labor estimate was provided by Toquop Energy and is based on the company's experience with similar projects. Table 4-13 shows the estimated project cost for the Proposed Action.

Population. Construction workers would be hired primarily from the local labor force. This includes workers from the Las Vegas metropolitan area; Mesquite and Overton, Nevada; and St. George, Utah. These workers are expected to commute daily to the project construction site. It is recognized that some construction workers may arrange for temporary residency (in rental homes or at recreational vehicle [RV] parks) in the Mesquite, Nevada, or the St. George, Utah, areas, which are relatively close to the project site. However, it is expected that the majority of construction workers would not choose to do so.

Construction workers and their families are not expected to relocate to the Clark/Lincoln County area from other areas. Workers having specialized skills may move to the area from other areas. Therefore, no increase to a minor increase in the population of the Clark/Lincoln County area is expected from constructing the Proposed Action.

TABLE 4-13
Estimated Project Cost for the Proposed Action[a]

Project Feature	Construction Cost Estimate ($ Million)	Percent Local (%)	Local Construction Cost Estimate ($ Million)
Power plant[b]	637	21	134
Access road	25	100	25
Water pipeline	12	50	6
Wells, wellfield electrical, storage tank	21	50	10
Total	695[c]	25	175

a Values provided by Toquop Energy
b Plant cost includes power block, ponds, water treatment equipment, cooling tower, condenser
c Does not include $23.1 million in water rights

Employment. According to Toquop Energy, the Proposed Action would generate peak and average construction employment levels of 950 and 500 workers, respectively, in the combined Lincoln and Clark County area. Project construction is expected to last 26 months, and annual construction payroll is estimated at $34 million. Although the unemployment rate in the region is not exceptionally high (the 2001 average was 7.2 percent in Lincoln County and 5.5 percent for Clark County), construction workers are expected to be hired from the local labor force. Thus, most construction workers would not relocate from other areas in the state or the country. Workers with specialized skills may be imported from other areas; however, this number is expected to be low when compared to the total number of construction workers required for construction of the Proposed Action.

Assuming an average annual direct construction employment level of 500 jobs, the resulting total employment generated would be about 875 jobs. This estimate is derived from the Type Social Accounting Matrix (SAM) employment multiplier of 1.75 for IMPLAN Sector 50: New Utility construction. The 875 jobs is the sum of the direct employment (500 jobs) and the indirect and induced employment of approximately 175 and 200 jobs, respectively. Indirect employment refers to the employment that is generated by the goods and services provided to construct and operate the Proposed Action. Induced employment refers to the employment generated by household spending, and includes the goods and services purchased by employees of the project.

Employment effects during the construction phase would be short-term because the jobs created would only last during the construction period. Although the effect of project construction on regional employment would be beneficial, it would increase employment in the region by less than 0.5 percent.

Unemployment. The total estimated number of jobs to be created by project construction in the Clark/Lincoln County area is 875. The creation of these jobs would have a slight beneficial impact on the unemployment rate; however, because the jobs created would be temporary, the benefit would also be temporary. Therefore, the creation of these jobs is not expected to change the unemployment rate in the region. Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, the unemployment rates in other areas would also not be affected.

Earnings and Income. Toquop Energy has indicated that the construction of the Proposed Action, including the power plant, access road, and water pipeline would result in an annual construction payroll of $34 million. The combined Lincoln and Clark County region Type SAM labor income multiplier for IMPLAN Sector 50: New Utility Construction is 1.46, therefore, the construction activities would generate an additional $16 million in indirect and induced labor income within the two-county region. The indirect and induced earnings were estimated to be approximately $8 million each. Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, earnings and income in other areas are not expected to change.

Income that would be generated during the construction phase is considered short-term because the additional income to the region would only last during the construction period. The total income effect of $50 million resulting from project construction would be beneficial, but not substantial, when compared to the two-county regional total personal income of $29 billion.

Tax Receipts. Lincoln County would collect sales and use tax on all real property purchased and delivered to the project site at a combined rate of 6.75 percent (2 percent sales tax, 2.25 percent local school support tax, 0.5 percent basic city-county relief tax, 1.75 percent supplemental city-county relief tax, and 0.25 percent infrastructure). The construction cost of the Proposed Action is estimated at approximately $695 million, of which approximately $70 million would be construction payroll. Assuming 75 percent of the remaining construction cost is for goods and materials, sales and use taxes in the range of $32 million would be generated from an estimated increase in taxable sales of about $470 million

These revenues are paid to the State of Nevada, which distributes money back to all counties. Of the cumulative sales and use tax rate of 6.75 percent, 3 percent would be disbursed back to the county of origin (Lincoln County for taxes on goods and materials delivered to the project site). Therefore, Lincoln County would be expected to collect approximately $14 million during the 26-month construction period (of the $32 million), in addition to the County's portion of the revenue generated from the remaining 3.75 percent of the cumulative tax rate. This would be a temporary (26-month) benefit to the County, increasing the County's sales tax receipts (the FY 1999-2000 sales tax was estimated at $1.7 million).

Clark County, along with all other Nevada counties, would receive portions of the remaining 3.75 percent of the sales and use tax collected on the estimated increase in taxable sales associated with project construction. This portion of sales tax redistributed to Clark County would be small relative to existing county sales and use tax receipts.

No construction activities would be associated with the proposed land exchange. However, the Toquop parcel (either the southern or northern parcel) would change to private ownership as part of the land exchange. The exchange of one parcel would generate a relatively small amount of property tax income for Lincoln County, in comparison to the $2.3 million in total property tax revenue generated in FY 1999-2000.

Housing. It is expected that the labor supply in the Clark/Lincoln County area is large enough that construction workers would not need to relocate from outside the area to construct the Proposed Action. If specialized labor is required that cannot be obtained in Clark County or Lincoln County, the number of people expected to move to the Clark/Lincoln County area from other areas is expected to be low. Housing vacancy rates are about 8.5 percent for Clark County and 29.3 percent for Lincoln County based on the 2000 Census. Because it is likely that most construction workers would be local residents, demand for housing is not expected to change as a result of project construction, and the housing vacancy rate would not be affected.

If construction workers choose to reside in RV parks in Mesquite or Overton, Nevada, nine RV parks with approximately 800 RV sites are available. If they choose to reside in RV parks in the St. George, Utah, area, six RV parks with 920 sites are available. Therefore, an adequate number of RV spaces is expected to be available to construction workers during project construction.

Economic Impacts of Operation

Operation of the Proposed Action would result in indirect and induced economic impacts that would occur within the region of influence. These indirect and induced impacts represent permanent increases in the region's economy. The indirect and induced impacts would result from annual expenditures on payroll as well as those on operations and maintenance.

The total estimated annual operation cost of the Proposed Action is $15.5 million, of which $13 million is the fixed annual operating cost and $2.5 million is annual payroll. All of these costs are expected to remain in the region of influence.

Population. Changes in the Clark/Lincoln County population as a result of operating the Proposed Action are not expected to occur from employment opportunities generated by the project. The operation workforce is very low (estimated at 25) and is expected to be hired from the local area.

Employment. The Proposed Action operational workforce is estimated to be 25. Operational personnel are expected to be hired from the local (Clark County and Lincoln County) workforce unless specialized expertise is required and the workers with specialized skills cannot be hired from the local area.

The 25 new jobs associated with the Proposed Action are anticipated to generate an additional 25 jobs within the two-county region. This estimate is based on the two-county region Type SAM employment multiplier of 2.03, associated with IMPLAN Sector 443: Electrical Services. Of the additional 25 additional jobs, 10 would be from indirect employment and 15 would be from induced employment. The 10 indirect jobs would be created in other industries as a result of operation of the plant by the 25 employees. The 15 induced jobs would result from the spending of earnings by the 35 people who would be employed at the 25 direct and 10 indirect jobs that would be created.

Employment effects during the operational phase would be permanent because the jobs created would remain throughout the life of the project. Although the 50 total additional jobs generated by the Proposed Action would be beneficial to the regional economy, the effect of project operation on regional employment would be minor relative to the 372,000 total employment reported for the two-county region of influence.

Unemployment. The total estimated number of jobs to be created in the Clark/Lincoln County area by project operation is 50. The creation of these jobs would not change the unemployment rate in the region.

Earnings and Income. Toquop Energy has indicated that the plant operation would have an annual payroll of $2.5 million. Based on this direct increase in labor income, the project operation phase would result in a total increase in labor income within the two-county region of about $3.7 million. This estimate is derived from the IMPLAN sector 433 labor income

multiplier of 1.49. The indirect and induced earnings are estimated at approximately $0.6 million each

Income that would be generated during the operational phase is considered permanent because the additional income to the Clark/Lincoln County region would remain throughout the life of the project. The income effect of $3.7 million resulting from project operation would be beneficial, but not substantial, when compared to the $29 billion total personal income level of the two-county region of influence.

Tax Receipts. Lincoln County would collect sales and use tax on all real property purchased and delivered to the project site at a combined rate of 6.75 percent. The annual fixed cost operating budget is anticipated to be approximately $13 million, excluding the cost of natural gas. If the entire annual operating budget represented purchases subject to Lincoln County sales tax, this would represent a substantial increase for Lincoln County, which reported taxable sales of $25.2 million for fiscal year 1999-2000. Of the 6.75 percent combined tax rate, 3 percent is collected and disbursed directly to the collecting county. This would represent an annual payment of approximately $390,000 to Lincoln County, in addition to the county's portion of the revenue generated from the remaining 3.75 percent of the combined tax rate. This increase in sales tax receipts to Lincoln County would be a benefit. The additional sales tax revenue to Clark County would represent a minor benefit to Clark County.

According to Nevada Revised Statutes, if electricity is sold outside of Lincoln County, the project facilities would be centrally assessed in combination with any of the owners of other Nevada holdings associated with the generation and transmission of electricity (NRS 361.320). The estimated annual property tax attributed to the Proposed Action would be approximately $7 million based on project capital cost ($695 million), the assessment rate (35 percent), and the average property tax rate (3 percent). If the project is centrally assessed, the disbursement of this tax to Lincoln County and Clark County would be governed by rules established by the Nevada Tax Commission and would depend on various factors that are unknown at this time. However, any increase in property taxes that would accrue to Lincoln County would be a benefit because of the county's relatively small tax base (the 1999-2000 total property tax collection was projected to be $2.3 million). Additional tax revenues from the Proposed Action to Clark County would be minor, relative to the property taxes collected in Clark County.

As discussed previously, Lincoln County's property tax revenues would increase because of the Toquop parcel (either the southern or northern parcel) being transferred from federal (BLM) jurisdiction to private ownership.

Other Income. Water rights that would be required to supply up to 7,000 acre-feet of water per year from the Tule Desert wellfield necessary to operate the Toquop Energy Project have been jointly applied for by Vidler Water Company, Inc. (a sister company of NLRC) and Lincoln County. Toquop Energy would lease and use these water rights for the 42-year life of the project at a cost of approximately $23.1 million. Lincoln County's estimated income for the water rights lease is approximately $9 million over the life of the project.

Infrastructure Construction and Operation Impacts

Education. It is expected that most of the construction workers and operation personnel would be from the region of impact (Clark and Lincoln counties), and would not be relocating their families to the area. Therefore, additional school capacity would not be required in the Clark/Lincoln County area because additional students are not expected to enroll in local schools.

Police Protection. Because additional residents are not expected to relocate to the Clark/Lincoln County area to construct or operate the project, existing police protection services would continue to serve the current population. This is also true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George.

The response time from the Pioche Sheriff Station to the Toquop area is approximately 2 hours. Because of the distance between the sheriff's department and the Toquop area, it may be difficult to adequately serve the Toquop area with existing staff. If determined necessary, an additional deputy would be hired to serve the southern portion of Lincoln County (Bradfield, 2001).

The Lincoln County Sheriffs Department has indicated that the Caliente substation is the closest to the project site (approximately 50 miles). Mutual aid agreements or an additional station may be needed to adequately serve the project (Willcock, 2001). Providing services to the project would put a strain on Lincoln County's police protection services (Carriger, 2001).

To minimize the strain that is expected to occur to Lincoln County police protection from construction and operation of the Proposed Action, measures that could include, but not be limited to, the following are included in the Proposed Action: develop a police agreement with Lincoln County and/or the City of Mesquite to provide additional personnel and services to the project site.

The method implemented to reduce the strain to either Lincoln County or the City of Mesquite police protection would be developed in consultation with and approved by the City or Lincoln County.

Fire Protection. Because additional residents are not expected to relocate to the Clark/Lincoln County area to construct or operate the project, existing fire protection services would continue to serve the current population. This is also true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George.

The response time from the Alamo Fire Station to the Toquop area is approximately 2 hours. Because of the distance between the Fire Department and the Toquop area, it may be difficult to adequately serve the Toquop area with existing staff (Bradfield, 2001).

The Lincoln County Sheriffs Department stated that the Caliente fire station is the closest to the project site (approximately 50 miles). Mutual aid agreements or an additional station may be needed to adequately serve the project (Willcock, 2001). Providing services to the project would put a strain on Lincoln County's fire protection services (Carriger, 2001).

To minimize the strain that is expected to occur to Lincoln County fire protection

from construction and operation of the Proposed Action, measures that could include, but not be limited to, the following are included in the Proposed Action:

- Provide onsite fire equipment and services
- Develop a fire agreement with Lincoln County and/or the City of Mesquite to provide additional personnel and services to the project site

The method implemented to reduce the strain to either Lincoln County or the City of Mesquite fire protection would be developed in consultation with and approved by the City or Lincoln County.

Hospitals and Medical Care. Additional residents are not expected to relocate to the Clark/Lincoln County area to construct or operate the project. Therefore, additional hospital beds and medical care staff and equipment would not be required to serve additional population.

Lincoln County would be responsible for providing medical care in case of emergency at the project site (Carriger, 2001). Ambulance services are available in Alamo, Pioche, Caliente, and Panaca (Thompson, 2001).

The Grover C. Dils Hospital in Caliente is located approximately 50 miles north of the southern Toquop site—although driving distance to Caliente from the project site is approximately 170 miles (Carriger, 2001). The hospital has an emergency department that handles everything but surgery. Those patients are sent to Las Vegas or St. George (Thompson, 2001).

The Dixie Medical Center, located in St. George, is about 30 miles from the project site. The medical center is currently being expanded. The medical center has an emergency department that can handle serious injuries (Lindsay, 2001).

The remoteness of the site would put a strain on existing Lincoln County medical services (Carriger, 2001).

To minimize the strain that is expected to occur to Lincoln County emergency medical services from construction and operation of the Proposed Action, measures that could include, but not be limited to, the following are included in the Proposed Action:

- Provide onsite emergency medical equipment and services
- Develop a medical aid agreement with Lincoln County and/or the City of Mesquite to provide additional personnel and services to the project site

The method implemented to reduce the strain to either Lincoln County or the City of Mesquite emergency medical services would be developed in consultation with and approved by the City or Lincoln County.

Water and Wastewater. It is anticipated that water required to construct the Proposed Action would be trucked from the Tule Desert wellfield to the project construction site (facility site and along the alignments) for construction activities and dust control. It would also be pumped from the Tule Desert wells and delivered to the site via pipeline after the pipeline is completed.

Water for operation of the Proposed Action over the life of the project would be obtained from the deep wells to be located in the Tule Desert. Water rights

that would be required to supply up to 7,000 acre-feet of water per year from the Tule Desert wellfield necessary to operate the project under the Proposed Action have been jointly applied for by Vidler Water Company, Inc. (a sister company of NLRC) and Lincoln County. Toquop Energy would lease and use these water rights for the 42-year life of the project.

The wells drilled in the Tule Desert in Lincoln County are capable of providing water in sufficient quantities to support the project facilities during operation. Therefore, there would be no impact on existing local water purveyors.

Portable toilets would be available at the project site and along the alignments for construction workers during construction of the Proposed Action. Sanitary wastes would be treated onsite during project operation.

Because additional residents are not expected to relocate to the Clark/Lincoln County area to construct or operate the project, additional water and wastewater systems would not be required as a result of implementing the project.

Natural Gas. Because workers are not expected to relocate to the area from outside the Clark/Lincoln County area to construct or operate the Proposed Action, additional residents are not expected to move to the area. Therefore, natural gas demand is not expected to increase as a result of the Proposed Action. This would also be true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George.

Negotiations are underway with the Kern River Gas Transmission Company regarding interconnecting with the natural gas pipeline. The Kern River Gas Transmission Company has adequate capacity in the 36-inch Kern River pipeline that crosses the southeast corner of the southern Toquop parcel to supply gas for operation of the Proposed Action.

Telephone. Because no increase in population is expected as a result of the project, construction and operation of the Proposed Action is not expected to affect telephone services in the Clark/Lincoln County area. This is also true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George. Communications during construction would be accomplished via a microwave system that would be constructed at the power plant site.

Electricity. Because workers are not expected to relocate to the area from outside the Clark/Lincoln County area to construct or operate the Proposed Action, additional residents are not expected to move to the area. Therefore, electrical demand is not expected to increase as a result of the Proposed Action. This is also true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George.

4.16.1.1.2 Pah Rah Parcel

Construction

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on existing population levels, existing employment levels, existing unemployment rates, existing earnings and income, or existing housing in Washoe County.

The proposed land exchange (Pah Rah parcel) would result in the existing

privately-owned parcel in Washoe County changing to federal (BLM) jurisdiction. Property taxes that are currently generated for Washoe County from the privately owned parcel would be eliminated with the property transfer to BLM ownership.

Operation

The proposed land exchange (Pah Rah parcel) would not affect Washoe County population levels, employment levels, or unemployment rates over the long term.

Infrastructure

No construction or operation activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on local public schools, police protection requirements, fire protection requirements, medical care requirements, water and wastewater facilities, natural gas providers, telephone service providers, or electricity providers in Washoe County.

4.16.1.2 Mitigation

No mitigation is required.

4.16.2 Alternative 1

4.16.2.1 Impacts

4.16.2.1.1 Construction Impacts. The effects on employment, unemployment, income, and tax receipts associated with Alternative 1 would be the same as those described for the Proposed Action because the estimated construction labor force requirements, labor payroll, and construction costs are the same as those assumed for the Proposed Action. In addition, the impacts on population, housing, and community infrastructure would be the same as described for the Proposed Action.

4.16.2.1.2 Operation Impacts. The effects on employment, unemployment, income, tax receipts, and income to Lincoln County from the water rights lease associated with Alternative 1 would be the same as described for the Proposed Action because the operation costs and labor requirements for both alternatives are estimated to be the same. In addition, the impacts on community infrastructure would be the same as described for the Proposed Action.

4.16.2.2 Mitigation

No mitigation is required.

4.16.3 Alternative 2

4.16.3.1 Impacts

4.16.3.1.1 Construction Impacts. The total estimated construction cost for Alternative 2 is approximately $739 million, of which $206 million would remain in the region of influence. The total annual estimated labor cost during construction is $34 million, all of which would be spent within the region of influence. Table 4-14 shows the estimated project cost for Alternative 2.

Population. The effects on population in the Clark/Lincoln County area from construction of Alternative 2 would be the same as described for the Proposed Action.

Employment. Toquop Energy has indicated that Alternative 2 would generate estimated peak and average construction employment of 950 and 500, respectively. Project construction is expected to last

TABLE 4-14
Estimated Project Cost for Alternative 2[a]

Project Feature	Construction Cost Estimate ($ Million)	Percent Local (%)	Local Construction Cost Estimate ($ Million)
Power plant[b]	637	21	134
Access road	43	100	43
Gas pipeline	15	50	8
Transmission line	23	50	12
Wells, wellfield electrical, storage tank	21	50	10
Total	739[c]	28	206

[a]Values provided by Toquop Energy.
[b]Plant cost includes power block, ponds, water treatment equipment, cooling tower, condenser.
[c]Does not include $23.1 million in water rights.

26 months. Although the unemployment rate in the region is not exceptionally high (the 2001 average unemployment rate was 7.2 percent in Lincoln County and 5.5 percent in Clark County), construction workers are expected to be hired primarily from the local labor force. Thus, most construction workers would not relocate from other areas in the state or the country. Workers with specialized skills may be imported from other areas; however, this number is expected to be low compared to the total number of construction workers required to construct this alternative.

Although the total cost associated with the construction of Alternative 2 would be somewhat higher than the Proposed Action, the estimated construction labor force is anticipated to be the same as for the Proposed Action. Therefore, the indirect and induced employment would be the same as those reported for the Proposed Action (a total temporary increase in employment of about 875 jobs).

Unemployment. The total estimated number of jobs that would be created by project construction in the Clark/Lincoln County area is 875. The creation of these jobs would have a slight beneficial impact on the unemployment rate; however, because the jobs created would be temporary, the benefit would also be temporary. Therefore, the creation of these jobs is not expected to change the unemployment rate in the region. Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, the unemployment rates in other areas would also not be affected.

Earnings and Income. Similar to the employment impacts, because the anticipated construction labor force requirements and payroll would be the same as for the Proposed Action, the total labor income would be the same as for the Proposed Action (a temporary annual increase of about $50 million during the construction period). Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, earnings and income in other areas are not expected to change.

Income generated during the construction phase would be considered short-term because the additional income to the region would only last during the construction period. The income effect of $50 million resulting from Alternative 2 construction would be beneficial, but not substantial, when compared to the two-county regional total personal income of $29 billion.

Tax Receipts. The estimated construction cost of Alternative 2 is approximately $739 million, which is somewhat higher than the costs of the Proposed Action. The temporary beneficial impact to Lincoln County and Clark County, in terms of increased sales and use tax disbursements from the construction of Alternative 2 components would be of the same magnitude as for the Proposed Action, but would be slightly higher.

Housing. The impacts on housing from construction of Alternative 2 would be the same as those described for the Proposed Action for the Clark/Lincoln County area.

Community Infrastructure. The impacts on community infrastructure from construction of Alternative 2 would be similar to those described for the Proposed Action for the Clark/Lincoln County area and would be the same as described for the Proposed Action for Washoe County. Alternative 2 would not require a pipeline to convey water (as the Proposed Action does), but would still require the development of the water wells in the Tule Desert. Alternative 2 would also require the construction of a transmission line and gas pipeline, which the Proposed Action would not require.

4.16.3.1.2 Operation Impacts. The effects on employment, unemployment, income, tax receipts, and income to Lincoln County from the water rights lease associated with Alternative 2 in the Clark/Lincoln County area would be the same as those described for the Proposed Action because the operation costs for both alternatives are estimated to be the same. In addition, the impacts on population, housing, and community infrastructure in the Clark/Lincoln County area would be the same as those described for the Proposed Action.

4.16.3.2 Mitigation

No mitigation is required.

4.16.4 Alternative 3

4.16.4.1 Impacts

4.16.4.1.1 Construction Impacts. The total estimated construction cost for Alternative 3 is approximately $714 million, of which $172 million would remain in the region of influence. The total annual estimated labor cost during construction is $34 million, all of which would be spent within the region of influence. Table 4-15 shows the estimated project cost for Alternative 3.

TABLE 4-15
Estimated Project Cost for Alternative 3[a]

Project Feature	Construction Cost Estimate ($ Million)	Percent Local (%)	Local Construction Cost Estimate ($ Million)
Power plant[b]	682	21	143
Access road	25	100	25
Water pipeline	3	50	2
Wells, wellfield electrical, storage tank	4	50	2
Total	714[c]	24	172

[a]Values provided by Toquop Energy.
[b]Plant cost includes power block, ponds, water treatment equipment, air cooled condenser.
[c]Does not include $0.4 million in water rights.

Population. The effects on population in the Clark/Lincoln County area from construction of Alternative 3 would be the same as described for the Proposed Action.

Employment. Toquop Energy has indicated that Alternative 3 would generate estimated peak and average construction employment of 950 and 500, respectively. Project construction is expected to last 26 months. Although the unemployment rate in the region is not exceptionally high (the 2001 average unemployment rate was 7.2 percent in Lincoln County and 5.5 percent in Clark County), construction workers are expected to be hired primarily from the local labor force. Thus, most construction workers would not relocate from other areas in the state or the country. Workers with specialized skills may be imported from other areas; however, this number is expected to be low compared to the total number of construction workers required to construct this alternative.

Although the total cost associated with the construction of Alternative 3 would be somewhat higher than the Proposed Action, the estimated construction labor force is anticipated to be the same as for the Proposed Action. Therefore, the indirect and induced employment would be the same as those reported for the Proposed Action (a total temporary increase in employment of about 875 jobs).

Unemployment. The total estimated number of jobs that would be created by project construction in the Clark/Lincoln County area is 875. The creation of these jobs would have a slight beneficial impact on the unemployment rate; however, because the jobs created would be temporary, the benefit would also be temporary. Therefore, the creation of these jobs is not expected to change the unemployment rate in the region. Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, the unemployment rates in other areas would also not be affected.

Earnings and Income. Similar to the employment impacts, because the anticipated construction labor force requirements and payroll would be the same as for the Proposed Action, the total labor income would be the same as for the

Proposed Action (a temporary annual increase of about $50 million during the construction period). Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, earnings and income in other areas are not expected to change.

Income generated during the construction phase would be considered short-term because the additional income to the region would only last during the construction period. The income effect of $50 million resulting from Alternative 3 construction would be beneficial, but not substantial, when compared to the two-county regional total personal income of $29 billion.

Tax Receipts. The estimated construction cost of Alternative 3 is approximately $714 million, which is somewhat higher than the costs of the Proposed Action. The temporary beneficial impact to Lincoln County and Clark County, in terms of increased sales and use tax disbursements from the construction of Alternative 3 components would be of the same magnitude as for the Proposed Action, but would be slightly higher.

Housing. The impacts on housing from construction of Alternative 3 would be the same as those described for the Proposed Action for the Clark/Lincoln County area.

Community Infrastructure. The impacts on community infrastructure from construction of Alternative 3 would be similar to those described for the Proposed Action for the Clark/Lincoln County area.

4.16.4.1.2 Operation Impacts. The effects on employment, unemployment, income, and tax receipts associated with Alternative 3 in the Clark/Lincoln County area would be the same as those described for the Proposed Action because the operation costs for both alternatives are estimated to be the same. The only exception is the reduction in quantity of water leased from 7,000 acre-feet per year (for the Proposed Action, Alternative 1, and Alternative 2) to 170 acre-feet per year for Alternative 3. Lincoln County would not receive an income for this lower quantity of water leased.

In addition, the impacts on population and community infrastructure in the Clark/Lincoln County area would be the same as those described for the Proposed Action.

4.16.4.2 Mitigation

Because no impacts are expected with implementation of Alternative 3, no mitigation is required.

4.16.5 Tax Receipts if No Land Disposal Were to Occur under the Proposed Action, Alternative 1, Alternative 2, or Alternative 3

4.16.5.1 Construction Impacts

If no land disposal were to occur as part of the Proposed Action, Alternative 1, Alternative 2, or Alternative 3, and the BLM granted ROWs to accommodate project features, Lincoln County would collect sales and use tax on all personal property purchased and delivered to the project site. Sales and use taxes in the range of $32 million would be generated and paid to the State of Nevada. Lincoln County would be expected to collect approximately $14 million during the 26-month project construction period, in

addition to the county's portion of the revenue generated from the remaining 3.75 percent of the cumulative tax rate. This would be a temporary (26-month) benefit to the County, increasing the County's sales tax receipts (the FY 1999-2000 sales tax receipts were estimated at $1.7 million).

The portion of sales tax collected during the construction of the Proposed Action or one of the three action alternatives that would be disbursed back to Clark County would be small relative to existing county receipts.

If no land disposal were to occur as part of the proposed project, the Pah Rah parcel would remain a privately owned parcel and would continue to generate property taxes for Washoe County. In turn, the Toquop parcel (either the southern or northern parcel) would remain in public ownership, and would, therefore, not generate property tax revenue for Lincoln County. The lack of disposal of one parcel to private ownership would not adversely affect Lincoln County. However, the lack of a disposal would eliminate the property tax benefit that would accrue to the county with implementation of the Proposed Action or one of the three action alternatives. The property tax revenue that Lincoln County currently generates (approximately $2.3 million in 1999-2000) would not be affected.

4.16.5.2 Operation Impacts

Lincoln County would collect sales and use tax on all real property purchased and delivered to the project site. The annual fixed cost operating budget is anticipated to be approximately $13 million, excluding the cost of natural gas. If the entire annual operating budget represented taxable sales, this would represent a substantial increase for Lincoln County, with reported taxable sales of $25.2 million for fiscal year 1999-2000. Of the 6.75 percent combined tax rate, 3 percent is collected and disbursed directly to the collecting county. This would represent an annual payment of approximately $390,000 to Lincoln County, in addition to the county's portion of the revenue generated from the remaining 3.75 percent of the combined tax rate. This increase in sales tax receipts to Lincoln County would be a benefit. The additional sales tax revenue to Clark County would represent a minor benefit to Clark County.

According to Nevada Revised Statutes, if electricity is sold outside of Lincoln County, the project facilities would be centrally assessed in combination with any of the owners of other Nevada holdings associated with the generation and transmission of electricity (NRS 361.320).

As discussed previously, Washoe County would continue to collect property tax revenues for the Pah Rah parcel.

4.16.6 No Action Alternative

Trends and future conditions associated with the social and economic conditions of Clark County and Lincoln County under the No Action Alternative are expected to be the same as existing conditions. As urban development occurs, construction employment would be generated, and as new businesses open, additional long-term employment, earnings, income, and taxes would be generated.

If the No Action Alternative were implemented, the Caliente MFP would not be amended; the Toquop/Pah Rah land exchange would not occur; and no power plant would be constructed in Lincoln

County. As a result, no short- and long-term employment, personal earnings and income, and tax receipts would be generated. In addition, neither Toquop parcel in Lincoln County would be transferred to private ownership, and, therefore, would not generate property taxes in that county. Taxes that are currently generated in Washoe County from the Pah Rah parcel would continue to be generated.

If the No Action Alternative were implemented and an electricity shortage occurs in the future as a result of the growth that is occurring in Clark County and in the Southwest, commercial and residential electric accounts may be expected to pay higher rates as alternative sources of electricity are obtained. If the prices are too high or if there is an electricity shortage, businesses or industries may close and leave the area, affecting local employment and earnings, income, and tax receipts.

4.17 Transportation

This analysis addresses the potential temporary traffic impacts from project construction activities, and the potential traffic impacts from project operation.

4.17.1 Proposed Action

4.17.1.1 Impacts

4.17.1.1.1 Toquop Area. Construction of the Proposed Action would result in a temporary (26-month) direct increase in average daily traffic (ADT) on I-15 near the East Mesa Interchange (Exit 109). Normal construction hours are expected to be from 6:00 a.m. to 3:00 p.m. on weekdays. Some activities may require extended construction hours, and nighttime construction may be necessary to meet the overall project schedule.

Average construction workforce is estimated at 500, resulting in an increase of 1,000 average daily vehicle trips in that area if each worker drove alone to and from the project site. Peak workforce is estimated at 950, resulting in an increase of 1,900 average daily vehicle trips in that area if each worker drove by himself to and from the project site. These are increases of 5 percent and 10 percent, respectively, over the future (2003) estimated ADT level of 18,818. In either instance, these are substantial increases in ADT on I-15. A review of hourly traffic volume along I-15 east of the East Mesa Interchange indicates the following travel characteristics for this area:

- Transient traffic entering and leaving Nevada, and not commuter traffic, occurs on this stretch of freeway. Traffic from Utah arrives near the East Mesa Interchange between 9:00 a.m. to 10:00 a.m.; peak traffic in that area is 10:00 a.m. to 11:00 a.m. (Leegard, 2001).

- For all days of the week, traffic levels are lowest at 2:00 a.m. After 2:00 a.m., traffic levels slowly begin to increase until they reach their peak between 2:00 and 4:00 p.m. After 4:00 p.m., traffic levels decrease (Leegard, 2001)

- Daily southbound (west) traffic levels are higher than northbound (east) traffic levels

Construction workers are assumed to travel daily to the project site from either the Las Vegas metropolitan area; Mesquite or Overton, Nevada; or St. George, Utah. If each worker travels to the project site in a personal vehicle, the increase in ADT

along I-15 during the project construction period would range from 5 to 10 percent. The workers would travel to the project site between 4:30 a.m. and 6:00 a.m., which is during a relatively low traffic period (peak morning traffic on I-15 in that area is from 10:00 a.m. to 11:00 a.m.).

This would result in a temporary adverse traffic impact on I-15 near the East Mesa Interchange. This is because adding 500 cars to I-15 between 3:00 p.m. and 4:00 p.m. would be an increase of approximately 84 percent in traffic. Adding 950 cars to I-15 between 3:00 p.m. and 4:00 p.m. would be an increase of approximately 159 percent in traffic.

Adding 500 to 950 cars to the East Mesa Interchange off ramp at the start of a shift and at the onramp at the end of a shift to exit and enter I-15 would affect traffic flow at the interchange at these two times of day. Throughout the rest of the day, the interchange onramp and off ramp traffic flow would not be affected.

Parking for construction workers would be provided at the power plant site which has sufficient area to accommodate large numbers of personal vehicles.

If construction workers are required to work at night, the additional traffic would not result in an impact on I-15 traffic. The increased traffic from project construction would be a high percentage of the existing nighttime traffic levels because the existing traffic numbers are so low (ranging from 255 to 1,313 between 6:00 p.m. and 6:00 a.m.).

In addition to construction workforce traffic, traffic would also be generated from equipment deliveries. However, once equipment is delivered to the project area, no effect on traffic would occur until the equipment is removed from the project area. These infrequent deliveries would not result in an impact on I-15 traffic. Deliveries of materials and concrete would also generate traffic, and would average 10 deliveries per day over the 26-month construction period. This would result in approximately 20 daily vehicle trips (10 trips accessing the project area and 10 trips leaving the project area). This increase in traffic would not adversely impact I-15 traffic. At the East Mesa Interchange, these 20 daily trips would result in a 6 percent increase in offramp traffic when traveling east/northbound on I-15, and a 4 percent increase in offramp traffic when traveling west/southbound.

A review of the capacity of the one-lane concrete underpass that crosses under I-15 at the East Mesa Interchange indicates that no improvements would be required to accommodate construction workforce and delivery traffic. Construction worker transport vehicles are all expected to be inbound to the project site at the start of a work shift, and would all be outbound from the project site at the end of a shift. Vehicles coming from opposing sides of the underpass would be required to give the right-of-way to the vehicle that arrived first at the underpass, in accordance with current traffic laws. Vehicles that are too large to pass through the underpass at the East Mesa Interchange would access the site by exiting and then later returning to I-15 via the Riverside-Bunkerville Interchange (Exit 112) and/or the Carp-Elgin Interchange (Exit 100), depending whether the vehicles are traveling eastbound or westbound.

Because I-15 was constructed to handle interstate traffic, it has been designed to handle the loads of semi-trucks and trailers. Therefore, construction of the Proposed Action would not affect existing

roadway condition. Prior to project construction, the access road to the southern Toquop parcel would need to be improved to accommodate materials delivery vehicles, equipment, and construction worker transport vehicles. Portions of the road would need to be widened to two lanes and straightened where necessary, and the entire length of the access road from I-15 to the south Toquop parcel would need to be paved.

Operation of the Proposed Action would be 24 hours per day, 365 days per year. The plant would be operated by 15 employees from 7:00 a.m. to 3:00 p.m.; 5 employees from 3:00 p.m. to 11:00 p.m.; and 5 employees from 11:00 p.m. to 7:00 a.m. These 25 employees would require an additional 50 vehicle trips per day: 20 trips at 7:00 a.m., 20 trips at 3:00 p.m., and 10 trips at 11:00 p.m. This amount of operation-induced traffic would not affect I-15 or East Mesa Interchange offramp traffic patterns.

The Proposed Action would result in increased traffic on the access road to the Southern Toquop Parcel and the wellfield. Several trucks and semi-trailers that currently drive to the well site have created powdered roads and have rutted the roads when they are wet. Paving the road and regulated speeds of project vehicles would reduce the potential for further road impacts.

Transportation-related measures to manage traffic during project operation are included in the Proposed Action and are described in *Appendix B, Standard Construction and Operation Procedures.* Measures include: vehicles coming from opposing sides of the underpass at the East Mesa Interchange during project construction would be required to give the right-of-way to the vehicle that arrived first at the underpass; and scheduling project vehicles during peak construction periods so that they arrive at the one-lane underpass at intervals considered suitable to provide smooth traffic flow patterns.

4.17.1.1.2 Pah Rah Parcel. Because no development would occur at the Pah Rah parcel, no changes in existing traffic levels on I-80 and SR-447 are expected.

4.17.1.2 Mitigation

The construction contractors will be encouraged to use staggered work shifts to minimize transportation conflicts.

4.17.2 Alternative 1

4.17.2.1 Impacts

Traffic impacts associated with Alternative 1 for both construction and operation would be the same as those described for the Proposed Action.

4.17.2.2 Mitigation

Mitigation described for the Proposed Action in the Toquop area also would be applicable to Alternative 1.

4.17.3 Alternative 2

4.17.3.1 Impacts

Traffic impacts associated with Alternative 2 for both construction and operation would be similar to those described for the Proposed Action, plus the access road would be extended to the northern Toquop parcel under Alternative 2.

4.17.3.2 Mitigation

Mitigation described for the Proposed Action in the Toquop area also would be applicable to Alternative 2.

4.17.4 Alternative 3

4.17.4.1 Impacts

Traffic impacts associated with Alternative 3 for both construction and operation would be the same as those described for the Proposed Action.

4.17.4.2 Mitigation

Mitigation described for the Proposed Action in the Toquop area also would be applicable to Alternative 3.

4.17.5 No Action Alternative

Trends and future conditions associated with traffic in the Toquop and Pah Rah areas under the No Action Alternative are expected to be the same as existing conditions. Therefore, no impact on existing traffic levels is expected with implementation of this alternative. Development may occur in the future in these areas, but the level and type of development that would occur and the associated traffic conditions is unknown.

4.18 Cumulative Impacts

4.18.1 Introduction

This section addresses potential cumulative impacts that would result from the effects of the Proposed Action or action alternatives when combined with the effects of other past, present, and reasonably foreseeable future projects. Reasonably foreseeable projects include those future actions that have been sufficiently defined to be: 1) relevant to potential impacts; 2) within the project area of influence; and 3) of a magnitude that could potentially result in a significant cumulative impact. Nine large interrelated projects were identified in *Section 1.8* of Chapter 1 whose effects may extend across a broad range of resources assessed in this document and possibly result in cumulative impacts on those resources. Descriptions of these interrelated projects and their geographic area of analysis are presented in the following text in *Section 4.18.2, Description of Interrelated Projects*. A discussion of the specific resources not cumulatively impacted is presented in *Section 4.18.3, Resources Not Cumulatively Impacted.* This section is followed by a discussion of resources that were analyzed in detail for potential cumulative impacts (see *Section 4.18.4, Resources Analyzed in Detail for Potential Cumulative Impacts*).

Potential cumulative effects of the nine interrelated projects, and of any other interrelated projects whose potential cumulative effects would be very resource-specific (for example, other projects that may only affect air quality), are described in the following text. Data on interrelated projects were sufficient for determining those resource areas where cumulative impacts would be expected and where they would not, and for assessing qualitatively or quantitatively (depending on the level of detail available) the potential for cumulative impacts on regionally important resources such as ground water, desert tortoise, air quality, and others.

Resource areas that would not be subject to cumulative impacts, and the associated rationale, are identified and not analyzed further.

4.18.2 Description of Interrelated Projects

Descriptions of the nine large interrelated projects that were considered in the cumulative impact analysis follow. They include three land development projects, five power plant projects, and one natural gas pipeline project. Map 1-3 in Chapter 1 shows the locations of these projects in relation to the Toquop Energy Project proposed southern and northern power plant sites.

4.18.2.1 Sale and Build-Out of Mesquite Lands Act Property

The BLM is proposing to transfer, by direct sale at fair market value, approximately 10,540 acres of public land to the City of Mesquite in Clark County, Nevada. The land has been separated into two parcels. The Joint-Venture Parcel covers approximately 5,540 acres and is north and west of the City of Mesquite and north of the Virgin River. The Contiguity Parcel covers approximately 5,000 acres, and is adjacent to and west of the Joint-Venture parcel and primarily south of I-15. The Mesquite Lands Act gives the City of Mesquite exclusive rights to purchase these two parcels from the United States (PBSJ 2000). The Toquop Energy Project southern parcel that is associated with the Proposed Action, Alternative 1, and Alternative 3 is approximately 12 miles northwest of the City of Mesquite. The Toquop Energy Project northern parcel is approximately 24 miles north-northwest of the City of Mesquite.

The City of Mesquite proposes to purchase and use these lands to promote orderly and quality urban development projects within the City of Mesquite. The City would sell and/or lease designated tracts to pre-qualified developers for use in establishing master-planned residential and thematic commercial developments consistent with the City's goals. Development potentials include residential, recreation, and commercial/industrial uses as well as open space. The City of Mesquite plans to acquire the Joint-Venture Parcel first, with build-out perhaps extending over approximately 20 to 30 years. Individual project developments may involve from approximately 320 to 500 acres, with the City and each selected project developer entering into a development agreement of at least 20 years. The overall anticipated build-out period of the Mesquite Lands Act property is approximately 50 years (PBSJ 2000). At buildout the project would require an estimated 11,000 afy of water.

The Environmental Assessment (EA) for the proposed sale and build-out of the Mesquite Lands Act property states that proposed development within the Joint-Venture and Contiguity Parcels will conform to the measure and objectives presented in the City of Mesquite's Long-Range Comprehensive Master Plan Population Element (PBSJ 2000). The EA concludes that adherence to the development and growth goals and objectives of the City's Long Range Comprehensive Master Plan while implementing the proposed development would provide benefits to the City of Mesquite and would reduce potential adverse impacts to population and socioeconomics to a level of less than significant (PBSJ 2000).

4.18.2.2 Sale and Build-Out of Lincoln County Land Act Property

The Lincoln County Land Act of 2000 (LCLA) identified for disposal approximately 13,500 acres of public

lands in Lincoln County, Nevada. In Phase 1 of the LCLA, the BLM is proposing to transfer 6,478 acres of this public land to private ownership by competitive sale. These lands are located in southeastern Lincoln County, north of Mesquite, Nevada. The Toquop Energy Project southern parcel is approximately 10 miles northwest of the LCLA lands and the northern parcel is approximately 22 miles north-northwest of the LCLA lands. Lands to be sold are currently undeveloped but are suitable for community development including public use and improvements. The Phase 1 competitive sale of 6,478 acres of transferred lands has been offered in three separate parcels of 4,357 acres, 2,009 acres, and 112 acres, rather than multiple smaller parcels, to better ensure development of planned communities and infrastructure (BLM 2001c).

Development and Conveyance Agreements between the developer and Lincoln County will require a land use map showing the general concept for master planned development of the acquired property, how the land will be used, the required public use conveyances, the public uses required, public use locations, and public use improvements. It is expected that development will occur at a density of 3.3 dwellings per gross acre and in planned units with clustering of village-like communities (BLM 2001c). The EA prepared for the sale and build-out of the Mesquite Lands Act property (PBSJ 2000) stated that the public lands identified for transfer to Lincoln County under the LCLA are located north of and adjacent to the Joint-Venture Parcel of the Mesquite Lands Act property. The EA stated further that Lincoln County lands transferred under the LCLA would be developed for municipal purposes similar to those being considered for the Joint-Venture Parcel, including residential, commercial, light industrial, and associated transportation (PBSJ 2000).

The EA prepared for the proposed LCLA stated that build-out of Phase I would occur over a 20-year period (BLM 2001c). The EA estimated that at build-out, the Phase I sale area would contain 21,377 dwellings, a population that could reach 57,718 residents (average of 2.7 persons per dwelling), and require approximately 21,400 acre-feet of water per year (approximately 1 acre-foot of water per year per dwelling) (BLM 2001c). The remaining approximately 7,000 acres of public lands in Lincoln County that would be disposed of under the LCLA would presumably be offered for competitive sale at some point in the future with the same development and conveyance agreement stipulations as described for the sale of Phase 1 lands. These Phase II lands would be adjacent to Phase I lands and have an estimated initial residential development capacity of approximately 14,000 dwelling units (BLM 2001c). This equates to approximately 37,800 residents and the annual need for approximately 14,000 acre-feet of water.

4.18.2.3 Coyote Springs Development Project

Coyote Springs Investment, LLC, (CSI) states that the proposed Coyote Springs Development Project will provide rural Nevada with a unique new town community. This development will be approximately 50 miles north of Las Vegas and roughly 50 miles west of the Toquop Energy Project site. The development area includes approximately 42,800 acres located east of U.S. Highway 93 and north of State Route 168 in the Coyote Spring Valley.

Approximately one-third of the land held by CSI is in Clark County and two-thirds is in Lincoln county (Stantec Consulting, PG Morros Corp., and Coyote Springs Investment, LLC 2001).

The Coyote Springs community, as envisioned, will consist of a series of neighborhoods with villages nestled between open space corridors. Initially, the community focus will be as a second-home retreat and destination vacation environment centered on golf courses. As it matures, the community will move toward self-reliance, with a full range of primary residential, commercial, and public facilities. These would include schools, grocery stores, and medical, police, and fire facilities The development schedule for the Coyote Springs project covers over 40 years (Stantec Consulting, PG Morros Corp., and Coyote Springs Investment, LLC 2001).

CSI plans to begin the entitlement process for approximately 13,100 acres in Clark County. Final build-out estimates for the Clark County portion of the Coyote Springs Development are for approximately 47,500 residential units, together with commercial and recreational facilities. CSI anticipates densities in the Lincoln County portion of the project will be similar to densities for Clark County. The final level of build-out in Lincoln County will depend on the amount of water resources available to the project. The project is estimated to require 59,000 afy of water.

4.18.2.4 Moapa Paiute Energy Center

The Moapa Band of Paiutes proposes to lease land and water use on the Moapa River Indian Reservation to the Calpine Corporation for the construction, operation, and maintenance of the Moapa Paiute Energy Center. A 760-MW water-cooled, natural gas-fired power plant would be located on the Reservation in Clark County, Nevada, approximately 10 miles southwest of the City of Moapa and 45 miles northeast of the City of Las Vegas (PBSJ 2001). The site is approximately 45 miles southwest of the Toquop Energy Project site. The proposed project also would include the following facilities:

- 5.2 miles of 500-kV transmission line connecting the proposed power plant to the existing Nevada Power Company Crystal Substation
- 0.6 mile of 16- to 20-inch-diameter, natural gas pipeline connecting the proposed power plant to the Kern River Natural Gas Pipeline
- Approximately 10 ground water wells and associated pipelines adjacent to the power plant
- Approximately 7 miles of a new 24-foot-wide access road from the proposed power plant to I-15 and its frontage road

Project construction is expected to last about 2 years, with operations scheduled to begin in 2003. Land disturbance would total approximately 222 acres, including 197 acres of Tribal land and 25 acres of BLM-administered land. The project would create about 400 local construction jobs at the peak of construction and have a total estimated construction cost of approximately $500 million. Once operational, the project would employ approximately 20 to 30 full-time local workers and have an annual operating cost of approximately $16 million, exclusive of fuel costs and major periodic maintenance costs. The land and water lease would be for 25 years, with a potential 20-year

renewal Water requirements are estimated to be 6,450 afy (PBSJ 2001).

4.18.2.5 Meadow Valley Generating Project

Pacific Gas & Electric National Energy Group (PG&E NEG) proposes to construct and operate the Meadow Valley Generating Project. A 1,000-MW water-cooled, natural gas-fired power facility would be located on a 155-acre site in northeastern Clark County, Nevada, 1.5 miles northwest of the City of Moapa. This site is approximately 37 miles southwest of the Toquop Energy Project site. The proposed Meadow Valley power plant site is within a 640-acre parcel of public land scheduled for disposal. The proposed project also would include the following facilities [PBSJ 2001, Federal Energy Regulatory Commission (FERC) and California State Lands Commission (CSLC) 2002]:

- 22 miles of 20-inch-diameter water lines to surface water and ground water sources, plus ground water wells along Meadow Valley Wash in Clark and Lincoln Counties
- 19 miles of 500-kV transmission line connecting the proposed power plant to the existing Nevada Power Company Crystal Substation
- 9 miles of 69-kV transmission line and 9 miles of 34.5-kV distribution line
- 0.8 mile of 20-inch-diameter, natural gas pipeline connecting the proposed power plant to the Kern River Natural Gas Pipeline

Project construction was scheduled to begin in 2002, with operations beginning in 2004 (PBSJ 2001). The project would create about 800 local construction jobs at the peak of construction, with approximately $40 million in material, equipment, and services to be purchased locally during construction. Once operational, the project would employ approximately 40 full-time local workers, with $6 to $7 million spent annually to purchase supplies and equipment. At the end of the power plant's expected life, water rights that had been purchased from local sources and water infrastructure would be donated to the Moapa Valley Water District and used to serve the local community's water needs. (PBSJ 2001). Water demand is assumed to be less than 100 afy based on the demand of similar plants.

4.18.2.6 Moapa Energy Facility Project

Duke Energy Moapa, LLC, is constructing and proposes to operate the Moapa Energy Facility Project. A 1,200-MW air-cooled, natural gas-fired power plant and ancillary facilities would be located on private land in the Apex Industrial Park in Clark County, Nevada. This site is approximately 26 miles southwest of the City of Moapa and 61 miles southwest of the Toquop Energy Project site. The proposed project also would include the following facilities:

- Two 4.8-mile long 500-kV transmission lines from the proposed power plant to the Nevada Power Company Harry Allen Substation
- A 3.8-mile-long, 16-inch-diameter natural gas pipeline connecting the proposed power plant to the Kern River Natural Gas Pipeline

Estimated permanent ground disturbance associated with power plant, transmission line, and gas tap construction would total

approximately 85 acres. The peak number of workers would be fewer than 100. The power plant is expected to have a nominal life of 30 years (PBSJ 2001, FERC and CSLC 2002).

4.18.2.7 Apex Generating Station Project

Mirant, Inc. is constructing and proposes to operate the Apex Generating Station Project. A 550-MW air-cooled, natural gas-fired power plant and ancillary facilities would be located on private land in the Apex Industrial Park in Clark County, Nevada. This site is approximately 24 miles southwest of the City of Moapa and 59 miles southwest of the Toquop Energy Project site. Two 500-kV transmission lines would connect the proposed power plant to the Nevada Power Company Harry Allen Substation. The Kern River Natural Gas Pipeline passes near the proposed plant site. Estimated permanent ground disturbance associated with power plant, transmission line, and gas tap construction would total approximately 77 acres. Construction is scheduled for completion in 2004. The power plant would have a nominal life of 30 years (PBSJ 2001, FERC and CSLC 2002). Water demand is assumed to be less than 100 afy based on the demand of similar plants.

4.18.2.8 Silverhawk Power Station Project

Pinnacle West Energy is constructing and proposes to operate the Silverhawk Power Station Project. A 550-MW natural gas-fired, combined cycle power plant and ancillary facilities would be located on private land in the Apex Industrial Park in Clark County, Nevada. This site is approximately 25 miles southwest of the City of Moapa and 60 miles southwest of the Toquop Energy Project site. Facility construction is anticipated to take 2 years and be complete in 2004 (PBSJ 2001, FERC and CSLC 2002). Permanent ground disturbances at this site would be expected to be similar to that for the two other Apex Industrial Park power plant projects described in the previous text. Water demand is assumed to be less than 100 afy based on the demand of similar plants.

4.18.2.9 Kern River 2003 Expansion Project

Kern River Gas Transmission Company (KRGT) is constructing and plans to operate facilities to expand the existing KRGT interstate natural gas pipeline system, extending from the City of Opal in southwestern Wyoming to the City of Mojave in southern California. The expansion would provide additional capacity to serve customers in Utah, Nevada, and California. The proposed project would involve the construction and operation of 717.5 miles of underground pipeline and appurtenant facilities as follows (FERC and CSLC 2002):

- 634.5 miles of 36-inch-diameter pipeline in Wyoming, Utah, Nevada, and California
- 82.2 miles of 42-inch-diameter pipeline in California
- 0.8 mile of 12-inch-diameter pipeline in Wyoming
- 163,700 horsepower of compression at three new and six existing compressor stations
- Modifications to five existing meter stations

Nominal construction right-of-ways would be approximately 75 to 80 feet wide. The proposed pipeline would loop or parallel an existing KRGT pipeline and pass through Lincoln County and Clark County, Nevada (FERC and CSLC 2002). The existing and proposed KRGT natural gas pipeline routes cross the southeast corner of the Toquop Energy Project southern parcel that is associated with the Proposed Action, Alternative 1, and Alternative 3. The estimated pipeline construction workforce in Clark and Lincoln Counties would range from 400 to 450 workers. Construction of the entire pipeline would take about 1 year and is scheduled to be complete in 2003 (FERC and CSLC 2002).

4.18.3 Resources Not Cumulatively Impacted

Results of impact analyses presented in *Sections 4.2* through *4.17* of this chapter show that some resources in the Toquop Energy Project area and Pah Rah parcel would either not be impacted by the Proposed Action or Alternatives 1, 2, or 3. These resource areas are identified in Table 4-16 as not being selected for detailed analysis for cumulative impacts.

4.18.4 Resources Analyzed in Detail for Potential Cumulative Impacts

The potential for cumulative impacts was analyzed for the resources impacted by the Proposed Action or Alternatives 1, 2, or 3. Some resources in the Toquop Energy Project area would either: 1) not be impacted by the Proposed Action or Alternatives 1, 2, or 3; or 2) potential impacts would be very minor, localized, and not overlap with the area of influence for interrelated projects. In these instances, neither the Proposed Action nor any of the action alternatives would contribute to cumulative impacts and these resources were not analyzed further. Other resource areas were analyzed in further detail and are discussed in the text below. The resources to be analyzed and the potential interrelated projects that may have cumulative effects are identified in Table 4-16, along with the level of analysis required. Table 4-17 summarizes the water demands and acres of land disturbance and for each of the interrelated projects.

There would be no cumulative impacts on resources in the Pah Rah area as a result of the proposed Toquop Project.

TABLE 4-16
Summary of Resource Area and Interrelated Project Analysis for Cumulative Impacts

Resource Area	Resource Area Selected for Detailed Analysis?	Interrelated Projects Analyzed (see legend)
Surface Water Hydrology	No	None
Recreation Resources	No	None
Land Use, Prime or Unique Farmlands, and Rangelands	No	None
Wild Horses and Burros	No	None
Hazardous and Solid Wastes	No	None
Indian Trust Assets	No	None
Environmental Justice	No	None
Paleontological Resources	No	None
Soils and Geology	Yes	1 through 9
Ground water resources	Yes	1 through 8
Biological resources	Yes	
Threatened and endangered species	Yes	1 through 9
Vegetation and noxious weeds	Yes	1 through 9
Wildlife and fisheries resources	Yes	1 through 9
Wetlands/riparian zones, floodplains, and Waters of the United States	Yes	9
Air quality and noise	Yes	
Air quality	Yes	1 through 9
Noise	Yes	9
Visual resources	Yes	9
Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers	Yes	1 through 9
Cultural and historical resources and Native American religious concerns	Yes	9
Socioeconomics	Yes	1 through 9
Transportation	Yes	9

1 – Mesquite Land Act
2 – Lincoln County Land Act
3 – Coyote Springs Development
4 – Moapa Paiute Energy Center
5 – Meadow Valley Generating Station
6 – Moapa Energy Facility
7 – Apex Generating Station
8 – Silverhawk Power Station
9 – Kern River 2003 Expansion

TABLE 4-17
Resource Utilization of Interrelated Projects

Interrelated Project	Ground Water Use (acre-feet/year)	Disturbed Acres (Total Project)
Mesquite Land Act (Phase I and II)	11,000 by 2020	10,540
Lincoln County Land Act (Phase I and II)	35,377 at buildout	13,500
Coyote Springs Development	59,500 at buildout	42,800
Moapa Paiute Energy Center	6,450	222
Meadow Valley Generating Station	Assumed 7,000	155
Moapa Energy Facility	Assumed less than 100	85
Apex Generating Station	Assumed less than 100	77
Silverhawk Power Station	Assumed less than 100	Assumed less than 100
Kern River 2003 Expansion	0	2,022
Subtotal	**119,627**	**69,461**
Toquop Energy Project (Proposed Action)	Up to 7,000	449 (includes temporary and long-term, 182 acres permanent disturbance)
Total	**126,627**	**69,910**

4.18.4.1 Soils and Geology

Potential project-related impacts on biological soil crusts would be localized and cumulative effects are a potential. Unfortunately, no data are available for interrelated projects that demonstrate any impact on biological soil crusts by those projects. Therefore, an assessment of cumulative impacts is not possible.

4.18.4.2 Ground Water Resources

4.18.4.2.1 Proposed Action. Section 4.4.1.1.1 concludes that the Proposed Action and the action-based alternatives would not adversely affect ground water levels or deplete ground water resources outside of the Tule Desert hydrographic area. Nevertheless, the EIS considers the cumulative regional demand for ground water from the interrelated projects identified in Section 4.18.2. Specifically, Table 4-17 presents the demand for ground water for both the interrelated projects and the Toquop Energy project Proposed Action. The total future demand from the interrelated projects is estimated to be approximately 119,327 afy, and the total demand for the Proposed Action is 7,000 afy.

4.18.4.2.2 Alternatives 1, 2, and 3. As with the Proposed Action, no cumulative impacts would be associated with Alternatives 1, 2, or 3.

4.18.4.3 Biological Resources

4.18.4.3.1 Threatened, Endangered, and Sensitive Species

Proposed Action. Potential cumulative impacts on desert tortoises from other proposed activities in the vicinity of the project consist of the effects of the nine interrelated projects described in *Section 4.18.2,* which include five other power projects, three land development projects, and one natural gas pipeline project. All five of the currently proposed power plants would impact desert tortoise habitat if constructed. The proposed Kern River Expansion gas pipeline project would also disturb desert tortoise habitat in the project area and region. Given that pipeline construction in the project area is currently scheduled for winter months, little or no increase in tortoise mortalities would result from construction activity. An ongoing potential exists for added incremental impacts from all projects that could have long-term effects. The improvement of existing roads and the construction of new roads could lead to increased human activities. Increased public access potentially increases tortoise mortality resulting from shooting, the number of tortoises collected for pets, and the number of tortoises run over by vehicles. Also, increased access elevates the potential for the public to release diseased tortoises into the wild.

The sale and build-out of the Lincoln County Land Act property, the Mesquite Land Act property, and the Coyote Springs Development Project could add to direct and indirect impacts on desert tortoise in Lincoln County and Clark County, which would include additional loss and fragmentation of desert tortoise habitat. However, these impacts would be reduced by implementation of the *Southeastern Lincoln County Multi-Species Habitat Conservation Plan* (HCP) currently under development and by the *Clark County Multiple Species HCP* (Clark County, 2000). Other sensitive species would also benefit from these HCPs. In addition, the USFWS prepared a Biological Opinion for development of the Apex Heavy Use Industrial Park where several of the power plants would be located that allows full development of that property. It is anticipated that the permitting process for the proposed project would have been completed before completion and implementation of the Lincoln County HCP; therefore, the proposed project would not be subject to any additional provisions of this HCP.

A detailed analysis of cumulative impacts of federal actions on the desert tortoise in southern Nevada is provided in the proposed *Caliente Management Framework Plan and Amendment* and the *Final Environmental Impact Statement for the Management of Desert Tortoise Habitat* (BLM, 1999). Of the large interrelated projects considered in this analysis approximately 2,000 acres would be affected by the Kern River Expansion Project, approximately 24,000 acres would be affected by the Lincoln County Land Act and Mesquite Land Act, approximately 42,800 acres would be affected by the Coyote Springs Development Project, and an estimated 700 acres would be disturbed in the long term by the five power projects. As described below, the Proposed Action would disturb 449 acres (182 acres net new disturbance). Collectively, the Proposed Action (449 acres) and interrelated projects would affect an estimated 69,900 acres.

The increased demand for development within the Mojave Desert ecosystem

spawned by the current national energy needs contribute to the cumulative loss of habitat for the desert tortoise as well as other sensitive species. To reduce the impacts of these actions on a cumulative level, the BLM Las Vegas and Ely Field Offices have developed restoration standards with the intention of reducing impacts over time by promoting faster recovery of disturbed areas. The restoration plan incorporates the level of disturbance anticipated and the biological sensitivity of the habitat to determine the actions required for each project. The plan includes pre-construction site assessment, detailed restoration procedures, a 5-year post-implementation monitoring program, and minimum success criteria. The Proposed Action will conform to the BLM's restoration plan, which will be developed on a project specific level as part of the Plan of Development (POD). As assurances for this long-term monitoring process, the BLM will require a bond to be posted by the right-of-way holder for the entire monitoring period.

Alternatives 1, 2, and 3. Cumulative direct and indirect impacts to desert tortoises resulting from the proposed Toquop Project and the nine interrelated projects would be similar to those described for the Proposed Action, differing only by the amount of habitat disturbed in the Toquop area under each alternative. Compared to the Proposed Action (449 acres temporarily disturbed, 182 acres permanently disturbed), nearly the same amount of total desert tortoise habitat would be disturbed under Alternative 1 (451 acres temporary, 182 acres permanent), more habitat would be disturbed under Alternative 2 (581 acres temporary, 237 acres permanent), and less habitat would be disturbed under Alternative 3 (417 acres temporary, 150 acres permanent). The Proposed Action and each action alternative would each temporarily disturb 222 acres of desert tortoise designated critical habitat and permanently disturb 61 acres of designated desert tortoise critical habitat in the Toquop area.

4.18.4.3.2 Vegetation and Noxious Weeds

Proposed Action. Cumulative impacts on vegetation would result from the combined effects of the nine interrelated projects (power plants, land acts and development, gas pipeline) and the proposed Toquop Project. Acres potentially affected would be the same as described in the preceding discussion of cumulative impacts on desert tortoise. Acres disturbed by the Proposed Action would comprise a very small portion of the total acres affected by the interrelated projects.

The types of direct and indirect cumulative impacts on vegetation would be similar to the types of direct and indirect effects on vegetation expected in the Toquop area. Direct impacts would result from construction activities on all of the interrelated projects, and some indirect impacts would result from increased public access and maintenance activities associated with all of the projects. Vegetation impacts would result from direct removal and fragmentation of habitat, degradation caused by soil compaction, and increased erosion. A potential would exist for added incremental impacts that could have long-term effects. Increased human activity associated with each of the interrelated projects and the proposed project would also impact vegetation in continually disturbed areas. The improvement of existing roads and construction of new roads could lead to increased human activities and potential ongoing

disturbance to vegetation. Improved access to the various project areas, especially related to the land acts and developments, may encourage greater OHV use and related impacts on vegetation. These impacts may be long-term because of the extensive length of time required to restore disturbed areas and vegetation in arid and semi-arid environments. The potential for the introduction and spread of noxious weeds via vehicles and soil disturbances also would increase as a result of the interrelated projects.

All of the interrelated projects would involve mitigation measures designed to avoid or reduce impacts on vegetation. Examples include measures to minimize the potential for long-term erosion, increase the stabilization of site conditions, and control the introduction and spread of noxious weeds. Measures to minimize impacts and restore vegetation disturbed by the proposed Toquop Project would be implemented as part of the BLM's habitat restoration plan that was discussed in the preceding section on desert tortoise cumulative impacts. The cumulative benefits of all these mitigation measures would be to minimize the magnitude, extent, and duration of cumulative impacts from the interrelated projects.

Alternatives 1, 2, and 3. Cumulative direct and indirect impacts on vegetation for Alternatives 1, 2, and 3 would be similar to those described for the Proposed Action. The only differences would be in the amount of habitat temporarily and permanently disturbed in the Toquop area under each alternative (see previous discussion of desert tortoise for acres disturbed). Cumulative impacts would be slightly greater under Alternative 2, while cumulative impacts for Alternatives 1 and 3 are expected to be the same as those of the Proposed Action.

4.18.4.3.3 Wildlife and Fisheries Resources

Proposed Action. Cumulative direct and indirect impacts on wildlife and their habitat, as well as associated mitigation measures, would be similar to the kinds of cumulative impacts and mitigation measures described in the preceding text for desert tortoise (a threatened wildlife species) and vegetation (wildlife habitat). Direct impacts would result from construction activities that cause a loss, degradation, and/or fragmentation of wildlife habitat, and some indirect impacts would result from increased public access and maintenance activities associated with all of the interrelated projects. The improvement of existing roads and construction of new roads could lead to increased human activities and potential ongoing, long-term disturbance to wildlife and their habitat. Increased human activity associated with each of the interrelated projects and the proposed project would impact wildlife in continually disturbed areas, potentially increasing mortality to some wildlife from vandalism. Improved access to the various project areas, especially related to the land acts and developments, may encourage greater OHV use and cause related impacts on wildlife. There would be no cumulative impacts on fisheries resources as a result of the proposed Toquop Project.

Cumulative impacts on wildlife and habitat would be reduced by implementation of many of the same mitigation measures and BLM restoration plans as described for the desert tortoise and vegetation. In addition, cumulative impacts would be reduced or avoided by implementation of the *Southeastern Lincoln County Multi-Species Habitat*

Conservation Plan currently under development and the *Clark County Multiple Species HCP*. All wildlife species would benefit from implementation of these HCPs.

Alternatives 1, 2, and 3. Cumulative direct and indirect impacts on wildlife and wildlife habitat for Alternatives 1, 2, and 3 would be similar to those described for the Proposed Action. The only differences would be in the amount of habitat temporarily and permanently disturbed in the Toquop area under each alternative (see previous discussion of desert tortoise for acres disturbed). Cumulative impacts would be slightly greater under Alternative 2. Cumulative impacts for Alternatives 1 and 3 are expected be the same as those described for the Proposed Action.

4.18.4.3.4 Wetlands/Riparian Zones, Floodplains, and Waters of the United States

Proposed Action. Minor impacts have previously occurred on the ephemeral washes within and adjacent to the existing access road, powerline right-of-way, and Kern River Gas Pipeline right-of-way. These minor impacts are associated with the construction of the roadway, the powerlines, and the gas pipeline. Some cumulative effects on ephemeral washes may occur from the current expansion of the Kern River Gas Pipeline. These are expected to be minor because the expansion will add only 20 feet to the existing pipeline right-of-way. Standard construction and operating procedures and best management practices of both the Toquop Energy Project and the Kern River Gas Pipeline Expansion will further minimize impacts to ephemeral washes.

Alternatives 1, 2, and 3. Cumulative impacts for Alternatives 1, 2, and 3 would be the same as those described for the Proposed Action.

4.18.4.4 Air Quality and Noise

4.18.4.4.1 Air Quality

Proposed Action

The analysis of cumulative air quality impacts is inherently different than other cumulative analyses in that the geographic extent of impacts is typically larger for air quality than for other issues. This air quality cumulative analysis therefore considers air emissions from additional sources beyond the interrelated projects listed above.

Construction. Because emissions from construction activities are frequently near-ground releases, the impacts would only occur over a limited geographic area in the immediate vicinity of the proposed facility. Construction of the Kern River Pipeline expansion would occur in the project area and create near-ground releases. It is expected that construction of the expansion will be complete or nearly complete as construction of the Toquop Energy Project begins. Cumulative effects during construction will be limited.

Operation. In order to assess potential cumulative impacts on air quality, two evaluation approaches were employed, PSD Increment Evaluation and NAAQS Evaluation. These are two of the primary tools used to evaluate cumulative air quality impacts in New Source Review air permitting, and thus were used in this evaluation. The PSD Increment Evaluation is used to estimate the degradation of air quality caused by construction of man-made sources of air pollution after certain

baseline dates. The NAAQS Evaluation is used to estimate the total impacts of all natural and anthropogenic sources of air pollution on air quality as compared to pollutant concentrations at which human health or the environment could be impacted.

For both the PSD Increment and NAAQS Evaluations, emissions from all permitted sources identified in the region by applicable regulatory agencies were quantified, and emission estimates for the interrelated projects listed above were prepared based on available data. Then sources with little or no chance of cumulatively contributing to total impacts in the vicinity of Toquop were screened out, based on criteria described further below.

PSD Increment Evaluation. Under the Clean Air Act (CAA), significant deterioration of local air quality is not allowed, regardless of existing air quality and whether this deterioration would cause a violation of ambient air quality standards. This potential deterioration is estimated through the PSD Increment Evaluation.

Table 4-18 presents the surrounding facilities that were considered for inclusion in the PSD increment analysis. This list was developed based on correspondence with NDEP BAQ, Clark County Health Department, Arizona Department of Environmental Quality, and the Utah Department of Environmental Quality, and includes identified emissions sources in all airsheds where the Proposed Action is predicted to have an impact of greater than modeling significance levels (commonly referred to as the significant impact level, or SIL) for all or portions of the airshed. Reasonably foreseeable actions were also included, based on information available from NEPA documentation for other interrelated projects. A total of 27 other facilities were considered in the PSD increment analysis.

The distance of the sources from the Proposed Action range from 41 to 130 km. Some of the sources were eliminated from the analysis because they were located outside of the PSD significant impact area. This area was defined based on modeled ambient impacts of the Toquop facility; facilities located outside of the area have little chance of appreciably affecting ambient air quality in the location where the Toquop facility cause impacts greater than the SIL.

Other sources were eliminated because of low emission rates. Even if located within areas where the Toquop facility could have impact greater than the SIL, facilities with low emission rates are unlikely to add appreciably to cumulative total impacts. A common evaluation tool used in the PSD program, the "20D" formula, was used for this screening. Specifically, for each pollutant, the surrounding source must have emissions (in tons per year) greater than 20 times the difference of distance between the surrounding source and the permitted source minus the radius of impact for the permitted source. In this manner, the analysis is simplified by eliminating sources that have minimal chance of creating measurable ambient impacts in the same vicinity as the permitted source.

Because the PSD increment is intended to allow evaluation of deterioration of air quality versus baseline conditions, it only includes sources that were permitted or constructed after certain baseline dates. Sources constructed prior to these baseline dates are not included in the increment analysis.

TABLE 4-18
Regional Increment Consuming Sources

Source	Location			Emissions (tons/year)			Within SIA			Required for Analysis Per "20D" Formula		
	County	State	UTMs* (km)	PM10	SO_2	NO_x	PM10	SO_2	NO_x	PM10	SO_2	NO_x
Permitted Sources												
Chemical Lime Company	Clark	NV	687.4 E 4,025.4 N	229.1	1115.5	20.2	No	No	No	No	No	No
Las Vegas Paving	Clark	NV	687.4 E 4,025.5 N	47.7	77.2	2.2	No	No	No	No	No	No
Granite Construction	Clark	NV	687.4 E 4,025.8 N	0.9	N/A	37.5	No	No	No	No	No	No
Georgia Pacific	Clark	NV	686.8 E 4,023.9 N	268.1	1.6	49.7	No	No	No	No	No	No
Harry Allen	Clark	NV	688.2 E 4,033.3 N	130.7	36.2	300.7	No	No	No	No	No	No
Nevada Cogeneration Associates	Clark	NV	690.9 N 4,029.2 N	65.7		132.8	No	No	No	No	No	No
Duke	Clark	NV	686.4 4,028.5	495.3	83.6	505.4	No	No	No	No	No	No
Mirant Las Vegas	Clark	NV	682.9 E 4,032.1 N	223.0	18.6	379.6	No	No	No	No	No	No
Reliant Energy Arrow Canyon	Clark	NV	690.8 E 4,029.3 N	179.5	N/A	189.1	No	No	No	No	No	No
Apex Waste Management Center	Clark	NV	690.0 E 4,026.1 N	1034.8	0.0	0.0	No	No	No	No	No	No
Highway 36	Clark	NV	697.0 E 4,039.5 N	14.7	0.0	0.0	N/A	N/A	Yes	No	No	No
Royal Cement	Clark	NV	722.2 E 4,058.5 N	1456.9	N/A	1456.9	N/A	N/A	Yes	No	No	Yes
Simplot Silica Products	Clark	NV	729.2 E 4,044.4 N	N/A	N/A	66.0	N/A	N/A	Yes	No	No	No
Leavitt Read Mix	Clark	NV	728.4 E 4,047.0 N	N/A	N/A	69.5	N/A	N/A	Yes	No	No	No

TABLE 4-18
Regional Increment Consuming Sources

Source	Location			Emissions (tons/year)			Within SIA			Required for Analysis Per "20D" Formula		
	County	State	UTMs* (km)	PM10	SO_2	NO_x	PM10	SO_2	NO_x	PM10	SO_2	NO_x
Reid Gardner	Clark	NV	711.3 E 4,059.3 N	N/A	N/A	2562.0	N/A	N/A	Yes	No	No	Yes
Bear River Contractors	Washington	UT	N/A	4.9	0.3	3.8	Yes	Yes	Yes	No	No	No
Interstate Rock Products	Washington	UT	N/A	9.2	0.3	3.9	Yes	Yes	Yes	No	No	No
Western Rock Products Corporation	Washington	UT	N/A	2.3	1.6	17.0	Yes	Yes	Yes	No	No	No
St. George City Power	Washington	UT	N/A	1.8	1.6	24.9	Yes	Yes	Yes	No	No	No
Genpak Corporation	Iron	UT	N/A	0.1	0.0	0.3	Yes	Yes	Yes	No	No	No
O'Sullivan Industries Incorporated	Iron	UT	N/A	2.1	0.0	0.8	Yes	Yes	Yes	No	No	No
Western Rock Products Corporation	Western Rock Products Corporation	UT	N/A	6.3	5.0	24.7	Yes	Yes	Yes	No	No	No
United Rock Products	Clark	NV	692.8 E 4,030.1 N	666.8	N/A	N/A	Yes	No	No	No	No	No
Great Start Cement	Clark	NV	692.3 E 4,030.7 N	347.5	N/A	N/A	Yes	No	No	No	No	No
Pinnacle West Silverhawk	Clark	NV	682.9 E 4031.1 N	195.1	38.9	272.7	No	No	No	No	No	No
Reasonably Foreseeable Actions												
Calpine Moapa	Clark	NV	N/A	193.0	17.4	352.1	Yes	Yes	Yes	No	No	No
PG&E	Clark	NV	713.4 E 4,062.8 N	417.1	333.7	200.2	Yes	Yes	Yes	Yes	No	No

*Universal Transverse Mercator.

The modeling of the Toquop facility itself demonstrated Toquop carbon monoxide (CO) impacts to be less than PSD modeling significance levels. Because CO was so far below the allowable PSD increment, cumulative modeling of CO impacts was not performed.

As shown in Table 4-18, most of the sources were screened out either because they were located at distances from the Proposed Action that exceeded the SIA or because emissions from those sources were less than the results of the "20D" formula. Only the Reid Gardner power plant, the Royal Cement plant, and the proposed PG&E power plant had emissions of sufficient magnitude and proximity to be included in the analysis. Note that some portions of the Reid Gardner plant were constructed prior to the major source baseline data; therefore, only portions of the Reid Gardner plant are included in the increment analysis whereas the entire plant is considered in the NAAQS analysis described below.

Of specific interest in this analysis, the Duke (Moapa Energy Facility), Mirant (Apex Generating Station), and Pinnacle West (Silverhawk Power Station) projects are located outside of the Toquop SIA. The Calpine (Moapa / Paiute Energy Center) project is located within the SIA, but was screened out on low emission rates based on the "20D" formula. The PG&E (Meadow Valley Generating Plant) project is located within the SIA, but was screened out on low emission rates based on the "20D" formula for all pollutants except PM10. The PG&E PM10 emissions were considered in the modeling analysis, but did not alter the highest reasonable but conservative increment consumption results.

Table 4-19 presents the results of the increment analysis. Predicted cumulative impacts for all pollutants, resulting from the Proposed Action plus surrounding sources, were less than the allowable PSD increment.

National Ambient Air Quality Standards Evaluation. The NAAQS analysis includes all nearby emissions sources, whether or not they were constructed before baseline dates. It includes background pollutant concentrations.

The evaluation procedure is similar to that of the increment analysis. The first primary difference is that all known emission sources, whether constructed after PSD major or minor source baseline dates or not, are considered in the analysis. As with the increment analysis, some sources can be screened out based on the "20D" formula of distance and emission rate. The other primary difference is that natural background concentrations are also to be considered.

Table 4-20 presents the sources included in the NAAQS analysis for the Proposed Action. This list was developed based on correspondence with NDEP BAQ, Clark County Health Department, Arizona Department of Environmental Quality, and the Utah Department of Environmental Quality. All sources except for the Reid Gardner power plant, Royal Cement, and the proposed PG&E power plant were screened out based on distance or emission rates. The proposed Beaver Dam combined cycle power plant project near Littlefield, Arizona was also identified as a reasonably foreseeable action based on its listing on the California Energy Commission web site; however, because no information was available on the

TABLE 4-19
Increment Analysis for Predicted Cumulative Impacts for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3

Pollutant	Averaging Period	Maximum Predicted Cumulative Impacts[a, b] ($\mu g/m^3$)	Toquop Energy Project Impact at Location of Maximum Impact[b] (ISC dispersion model)	PSD Class II Increment ($\mu g/m^3$)
Nitrogen dioxide (NO_2)	Annual	21.24	0.1	25
Carbon monoxide (CO)	8-hour	N/A	N/A	N/A
	1-hour	N/A	N/A	N/A
Sulfur dioxide (SO_2)	Annual	2.47	2.47	20
	24-hour	9.96	9.96	91
	3-hour	22.77	22.77	512
PM10	Annual	5.43	5.43	17
	24-hour	21.8	21.8	30

[a]Maximum predicted impacts reflect combined impacts from proposed facility and emission inventory sources.
[b]Alternative 2 and 3 impacts not specifically quantified. However, for reasons discussed in text, cumulative impacts on increment for Alternative 2 could possibly exceed those presented here, but cumulative impact for Alternative 3 is anticipated to be within 1 percent of values presented here.

magnitude of air emissions, it was not included in this analysis.

Of specific interest in this analysis, the Duke (Moapa Energy Facility), Mirant (Apex Generating Station), and Pinnacle West (Silverhawk Power Station) projects are located outside of the Toquop SIA. The Calpine (Moapa/Paiute Energy Center) project is located within the SIA, but was screened out on low emission rates based on the "20D" formula. The PG&E (Meadow Valley Generating Plant) project is located within the SIA, but was screened out on low emission rates based on the "20D" formula for all pollutants except PM10. The PG&E PM10 emissions were considered in the modeling analysis, and did increase the maximum predicted NAAQS impacts over those reported in the PSD permit application; the results provided in Table 4-21 include predicted impacts from the PG&E project.

Because of the remote location of the plant site for the Proposed Action, and the lack of major metropolitan areas in the vicinity, NDEP recommended that the background concentrations of NO_x and SO_2 be assumed as zero for the PSD permit analysis. Consistent with NDEP's recommendation, this analysis assumes that background concentrations for these pollutants will be small compared to the localized impacts of the Toquop project. Thus, it is assumed that any ambient concentrations of NO_x or SO_2 in the area would be from the Proposed Action or other emission sources already included in the NAAQS analysis.

For PM10, NDEP BAQ estimates background concentration to be 10.2 $\mu g/m^3$ for a 24-hour averaging period and 9 $\mu g/m^3$ for an annual averaging period. No ambient air monitors exist in the area; these values were estimated by NDEP BAQ based on data from other sites with similar climate and soils, and represent PM10 caused by windblown dust in a hot and arid region.

TABLE 4-20
NAAQS Regional Sources

Source	Location			Emissions (tons/year)			Within SIA			Required for Analysis Per "20D" Formula		
	County	State	UTMs* (Km)	PM10	SO_2	NO_x	PM10	SO_2	NO_x	PM10	SO_2	NO_x
Permitted Sources												
Chemical Lime Company	Clark	NV	687.4 E 4,025.4 N	2451.7	1661.3	1874.0	No	No	No	No	No	No
Las Vegas Paving	Clark	NV	687.4 E 4,025.5 N	0.9	77.2	2.2	No	No	No	No	No	No
Granite Construction	Clark	NV	687.4 E 4,025.8 N	47.7		37.5	No	No	No	No	No	No
Georgia Pacific	Clark	NV	686.8 E 4,023.9 N	268.1	1.6	49.7	No	No	No	No	No	No
Harry Allen	Clark	NV	688.2 E 4,033.3 N	130.7	1.0	300.7	No	No	No	No	No	No
Nevada Cogeneration Associates	Clark	NV	690.9 N 4,029.2 N	1.9		132.8	No	No	No	No	No	No
Duke	Clark	NV	686.4 4,028.5	495.3	83.6	505.4	No	No	No	No	No	No
Mirant Las Vegas	Clark	NV	682.9 E 4,032.1 N	223.0	18.6	379.6	No	No	No	No	No	No
Reliant Energy Arrow Canyon	Clark	NV	690.8 E 4,029.3 N	179.5		189.1	No	No	No	No	No	No
Apex Waste Management Center	Clark	NV	690.0 E 4,026.1 N	1034.8	0.0	0.0	No	No	No	No	No	No
Highway 36	Clark	NV	697.0 E 4,039.5 N	14.7	0.0	0.0	Yes	No	No	No	No	No
Royal Cement	Clark	NV	722.2 E 4,058.5 N	N/A	N/A	2004.4	Yes	Yes	Yes	No	No	Yes
Simplot Silica Products	Clark	NV	729.2 E 4,044.4 N	N/A	N/A	219.0	Yes	Yes	Yes	No	No	No

TABLE 4-20
NAAQS Regional Sources

Source	Location			Emissions (tons/year)			Within SIA			Required for Analysis Per "20D" Formula		
	County	State	UTMs* (Km)	PM10	SO_2	NO_x	PM10	SO_2	NO_x	PM10	SO_2	NO_x
Leavitt Read Mix	Clark	NV	728.4 E 4,047.0 N	N/A	N/A	222.5	Yes	Yes	Yes	No	No	No
Reid Gardner	Clark	NV	711.3 E 4,059.3 N	533.3	12587.3	18538.5	Yes	Yes	Yes	Yes	Yes	Yes
Bear River Contractors	Washington	UT	N/A	4.9	0.3	3.8	Yes	Yes	Yes	No	No	No
Interstate Rock Products	Washington	UT	N/A	9.2	0.3	3.9	Yes	Yes	Yes	No	No	No
Western Rock Products Corporation	Washington	UT	N/A	2.3	1.6	17.0	Yes	Yes	Yes	No	No	No
St. George City Power	Washington	UT	N/A	1.8	1.6	24.9	Yes	Yes	Yes	No	No	No
Genpak Corporation	Iron	UT	N/A				Yes	Yes	Yes	No	No	No
O'Sullivan Industries Incorporated	Iron	UT	N/A	2.1	0.0	0.8	Yes	Yes	Yes	No	No	No
Western Rock Products Corporation	Iron	UT	N/A	6.3	5.0	24.7	Yes	Yes	Yes	No	No	No
United Rock Products	Clark	NV	692.8 E 4,030.1 N	666.8	N/A	N/A	Yes	No	No	No	No	No
Great Start Cement	Clark	NV	692.3 E 4,030.7 N	347.5	N/A	N/A	Yes	No	No	No	No	No
Pinnacle West Sliverhawk	Clark	NV	682.9 E 4031.1 N	195.1	38.9	272.7	No	No	No	No	No	No
Reasonably Foreseeable Actions												
Calpine Moapa	Clark	NV	N/A	193.0	17.4	352.1	Yes	Yes	Yes	No	No	No
PG&E	Clark	NV	713.4 E 4,062.8 N	0.0	0.0	0.0	Yes	Yes	Yes	Yes	No	No

*Universal Transverse Mercator.

TABLE 4-21
NAAQS Analysis for Predicted Cumulative Impacts for the Proposed Action, Alternative 1, Alternative 2, and Alternative 3

Pollutant	Averaging Period	Maximum Predicted Cumulative Impacts[a, b] ($\mu g/m^3$)	Toquop Energy Project Impact at Location of Maximum Impact[b] ($\mu g/m^3$)	Background ($\mu g/m^3$)	Maximum Predicted Impact with Background[b]	NAAQS
Nitrogen dioxide (NO_2)	Annual	93.03	0.09	0	93.03	100
Carbon monoxide (CO)	8-hour	N/A[c]	N/A[c]	0	N/A	10
	1-hour	N/A[c]	N/A[c]	0	N/A	40
Sulfur dioxide (SO_2)	Annual	54.09	0.041	0	54.09	80
	24-hour	216.36	0.164	0	216.36	365
	3-hour	486.81	0.369	0	486.81	1,300
PM10	Annual	14.8	0.084	9	23.8	50
	24-hour	59.1	0.344	10.2	69.3	150

[a] Maximum predicted impacts reflect combined impacts from proposed facility and emission inventory sources.
[b] Alternative 2 and Alternative 3 impacts not specifically quantified. However, for reasons discussed in text, only trivial differences in cumulative impacts are anticipated for both Alternative 2 and Alternative 3 versus values presented here.
[c] Cumulative CO impacts not analyzed, as all Toquop CO impacts were less than modeling significance levels.

The modeling of the Toquop facility itself demonstrated Toquop CO impacts to be less than PSD modeling significance levels. Because CO was so far below the allowable NAAQS, cumulative modeling of CO impacts was not performed.

Table 4-21 presents the results of the NAAQS analysis. The estimated total ambient impact of the Proposed Action and all other emission sources in the vicinity, combined with background concentrations, are presented and compared to the NAAQS. For all three pollutants, under all averaging times, the reasonable but conservative impact is shown to be less than the NAAQS.

For each pollutant, the Proposed Action contribution to impacts for the receptors with the highest estimated impacts would be less than 1 percent of the total. Furthermore, the maximum estimated impact caused by the Proposed Action alone would be a small fraction of the maximum estimated cumulative impact.

It should be noted that, based on lack of complete data, relatively conservative assumptions were used for dispersion modeling of the surrounding sources. Data on stack parameters and pollutant emission rates were available from NDEP and Clark County, but complete data needed for accurate analysis of building downwash as affected by building dimensions were not available. Furthermore, the surrounding sources were modeled using the same hypothetical, worst-case meteorological data set as used for the Proposed Action, although actual meteorological data may have been available for the vicinity of the

sources. The analysis presented is, therefore, conservative and most likely overestimates ambient impacts.

Land Act and Residential Development Evaluation. Cumulative impact of the air emissions from the Toquop Power Project and the residential development associated with the Lincoln County Land Act, Mesquite Land Act, or Coyote Springs Development Project are not expected to create adverse consequences for human health or the environment. Neither the Toquop project nor residential communities created by the land acts or the development project are expected to individually create adverse consequences. Based on location and prevailing winds it is unlikely that Toquop and any of the development projects could create ambient impacts in the same area at the same time.

Information required to quantitatively estimate impacts of the land acts or the Coyote Springs Development Project is not available, and any estimate of cumulative impacts would be highly speculative. However, emissions from space heating of residences constructed in these areas are expected to be very small, because of the warm climate. Anticipated emissions would be created primarily by automobile traffic from commuters and by construction-related dust and diesel exhaust. Ambient impacts of these emissions are anticipated to be far below the National Ambient Air Quality Standards.

As graphically illustrated in the air permit application for the project, the results of the reasonable but conservative air dispersion modeling of the Toquop project predicted that the highest ambient impacts, while relatively minor, would occur in the elevated terrain west (East Mormon Mountains) and north (Jumbled Mountain) of the facility. The Lincoln County Land Act and Mesquite Land Act are located southeast, at distances of 5 to 12 miles, of the facility. Therefore, the only time that emissions related to the land acts could appreciably impact ambient conditions is during periods of southeast winds. In the Toquop area, southeast winds are infrequent and are of low velocity. The Coyote Springs Development Project would be located approximately 50 miles west of Toquop and 32 miles west of the East Mormon Mountains, and, furthermore, is topographically separated from the East Mormon Mountains by the Mormon Mountains. Based on the number of vehicles expected to result from the land acts, it is extremely unlikely that either criteria pollutant or hazardous air pollutant emissions from the automobile traffic or residential construction would result in measurable impacts in the elevated terrain west and north of the Toquop facility.

Alternative 1. All cumulative impacts from Alternative 1 plus surrounding facilities would be equal in all respects to the cumulative impacts resulting from the Proposed Action plus surrounding facilities.

Alternative 2

Construction. All cumulative impacts from Alternative 2 plus surrounding facilities during the construction phase would be the same as the cumulative impacts resulting from the Proposed Action plus surrounding facilities.

Operation

PSD Increment Evaluation. Most of the sources included in the increment analysis for the Proposed Action were in the Apex Valley or Moapa areas; the plant site for

Alternative 2 would be approximately 11 miles farther away than the Proposed Action from most of these sources.

For SO_2 and PM10, the Proposed Action impacts at the receptor demonstrating the maximum increment consumption were equal to the total increment consumption (that is, at the point of the modeled maximum increment consumption, the contribution from the surrounding sources was nearly zero; thus the Proposed Action was the sole cause of the increment consumption at that point). Given the further distance from the Apex and Moapa areas to both the Alternative 2 plant site and Jumbled Mountain, it is highly unlikely that any of the listed sources could increase PM10 or SO_2 impact to increment consumption. As discussed above, it is assumed that the maximum PM10 and SO_2 impacts from Alternative 2 would be equal to or greater than those for the Proposed Action. The worst-case calculated 24-hour impact for PM10 from Alternative 2 would be 73 percent of the allowable PSD increment. Given the possible higher impacts from Alternative 2, it is possible that Alternative 2 would cause a violation the 24-hour PM10 PSD increment.

For NO_x, the highest predicted impact from the Proposed Action was 12.6 $\mu g/m^3$. The highest calculated increment consumption was 21.2 $\mu g/m^3$; the Proposed Action impact at this receptor was insignificant (0.1 $\mu g/m^3$). The allowable PSD increment for annual NO_x is 25 $\mu g/m^3$. Given the large NO_x emissions of the Reid Gardner project, it is unlikely that the Reid Gardner project would be eliminated for Alternative 2 based on the "20D" formula described for the Proposed Action. Therefore, it is assumed that the location of the receptor of highest modeled impact would still be the same, unless the Alternative 2 impacts on Jumbled Mountain would exceed 21 $\mu g/m^3$, and that the Alternative 2 contribution at that point would still be minimal. It is highly unlikely that the modeled increment consumption would be less than 21 $\mu g/m^3$. However, in the case of a modeled high impact on Jumbled Mountain it is possible that increment consumption could be higher for Alternative 2 than for the Proposed Action, and that the allowable increment would then be exceeded.

Again, the only two reasonably foreseeable actions potentially impacting air quality in the vicinity of Alternative 2 for which data are available are the Calpine Moapa and PG&E NEG projects. Both would be located farther from Alternative 2 than the Proposed Action. It is, therefore, assumed that neither project would affect the predicted worst-case increment consumption.

NAAQS Evaluation. Most of the sources included in the NAAQS analysis for the Proposed Action were in the Apex Valley or Moapa areas, so the plant site for Alternative 2 would be approximately 11 miles farther away than the Proposed Action from most of these sources. It is assumed, therefore, that, as with the Proposed Action, all but the Reid Gardner project would be found to be insignificant in an NAAQS analysis of Alternative 2.

For the worst-case impacts predicted under the Proposed Action analysis, the Proposed Action contribution to the worst case for each pollutant and each averaging time is less than 1 percent of the total. Furthermore, the worst-case impact of the Proposed Action at any other location would also be a small fraction of the NAAQS for all pollutants.

For example, for annual NO_x, the worst-case cumulative impact of the Proposed Action plus all other sources in the vicinity was estimated to be 93.0 $\mu g/m^3$. This predicted impact occurred at a receptor in the Moapa vicinity and was based primarily on Reid Gardner emissions. The Proposed Action contribution at that receptor was 0.09 $\mu g/m^3$, or 0.1 percent of the total. The predicted worst-case impact of the Proposed Action at any other location was 12.6 $\mu g/m^3$; this location was between the proposed source location and the East Mormon Mountains.

For Alternative 2, therefore, it is highly unlikely that a NAAQS evaluation would predict any impact different from that for the Proposed Action. The Proposed Action contributions to the total were small, and by relocating the plant site farther away from the sources that created the impact, it is anticipated that the change to the worst-case impact would be trivial. Most likely, all predicted impacts would remain below the NAAQS, and the worst-case impacts would not change by more than a few percent.

Again, the only two reasonable foreseeable actions that could affect the NAAQS analysis for Alternative 2 for which data are available are the Calpine Moapa and PG&E NEG projects. Both projects would be farther from Alternative 2 than the Proposed Action. As with the Proposed Action cumulative analysis, the inclusion of these projects would not affect an Alternative 2 NAAQS analysis for NO_x or SO_2, and would add a small contribution to a PM10 NAAQS analysis. It is therefore assumed that the predicted cumulative worst-case impacts of Alternative 2, all sources in the vicinity with emission permits or submitted permit applications, plus all reasonably foreseeable actions, added to natural background concentrations, would be well below the allowable standards for all pollutants.

Alternative 3. Except for the possible trivial differences in near-field impacts created by Alternative 3 itself, all cumulative impacts from Alternative 3 plus surrounding facilities would be the same as the cumulative impacts resulting from the Proposed Action plus surrounding facilities.

4.18.4.4.2 Noise

Proposed Action. The Kern River 2003 Expansion Project (see *Section 4.18.2, Description of Interrelated Projects*), which would cross the Toquop parcel and is expected to be constructed in November 2002 through January 2003 in the project area, would be the closest to the Toquop Project, both geographically and in time. However, the construction periods of the Kern Project and the Proposed Action would be relatively short-term and would not overlap. In addition, there are no sensitive receptors near the southern Toquop parcel. Therefore, the two projects would result in no cumulative impacts on ambient noise levels.

Because no impacts on ambient noise levels are expected from implementation of the Proposed Action in the Toquop area, the project would not contribute to a cumulative noise impact in the Toquop area. Because no impact on ambient noise levels would occur at the Pah Rah parcel, the Proposed Action would not contribute to a cumulative noise impact in that area.

Alternatives 1, 2, and 3. Because no impacts on ambient noise levels are expected from implementation of Alternatives 1 and 2 (water-cooled facility) or Alternative 3 (air-cooled

facility) in the Toquop area, these alternatives would not contribute to a cumulative noise impact in the Toquop area. Because no impact on ambient noise levels would occur at the Pah Rah parcel, these alternatives would not contribute to a cumulative noise impact in that area.

4.18.4.5 Visual Resources

4.18.4.5.1 Proposed Action.

Cumulative impacts on visual resources could occur where project facilities or construction activities occupy the same field of view as other built facilities and further degrade the view. A cumulative impact also could occur if a viewer's perception is that the general visual quality of an area is diminished by the presence of structures or construction effects (such as disturbed vegetation), even if the new structures are not within the same field of view as the existing structures.

For the Toquop area, the proposed power plant (aboveground features only) and other future developments described in *Section 4.18.2, Description of Interrelated Projects*, would alter the landscape character of the project site and regional landscape. Specifically, the Kern River 2003 Expansion Project, which would cross the Toquop parcel and is expected to be constructed in November 2002 through January 2003 in the project area, would be the closest to the Toquop Project, both geographically and in time. The EIS/EIR for the Kern Project identified mitigation for impacts on visual resources. The identified mitigation would reduce impacts to less-than-significant levels. Although the landscape would be altered with these future developments, implementation of the Proposed Action and the other projects would not result in cumulative impacts on visual resources in the Toquop area. This is because views of the southern project site from the surrounding area are limited, views from I-15 are obstructed, no sensitive receptors are in the immediate vicinity, and the adjacent lands are not high-use recreation areas.

None of the other projects identified in *Section 4.18.2, Description of Interrelated Projects*, would result in cumulative impacts with the Proposed Action.

For the Pah Rah area, because no development would occur at the Pah Rah parcel from implementing the Proposed Action, the Proposed Action would not contribute to cumulative impacts on visual resources in that area.

4.18.4.5.2 Alternative 1. Cumulative impacts for Alternative 1 would be similar to those described for the Proposed Action. An easterly water pipeline alignment associated with this alternative (as opposed to a westerly alignment with the Proposed Action) would not result in a substantive difference in the contribution to cumulative visual impacts by this alternative, when compared to the Proposed Action. This is because the pipeline is an underground project feature, resulting in short-term impacts to the landscape occurring during the project construction period, and minimal, if any, long-term changes to the landscape expected.

For the Pah Rah area, because no development would occur at the Pah Rah parcel from implementing Alternative 1, it would not contribute to cumulative impacts on visual resources in that area.

4.18.4.5.3 Alternative 2. Landscape alterations associated with Alternative 2 would be similar in type, but of greater magnitude, than those described for the Proposed Action. This is because this

alternative involves development of the power plant at the northern site rather than the southern site (as was the case for the Proposed Action). That plant site location requires other necessary changes to the landscape including a longer access road than was needed for the Proposed Action, an easterly gas pipeline alignment (not needed for the Proposed Action), and an easterly overhead electrical transmission line alignment (also not needed for the Proposed Action). A water pipeline (that was needed for the Proposed Action) would not be needed as part of this alternative.

Although the landscape would be altered by implementation of Alternative 2 in combination with the Kern River 2003 Expansion Project, their implementation would not result in cumulative impacts on visual resources in the Toquop area. This is because views of the northern project site from the surrounding area are limited, views from I-15 are obstructed, no sensitive receptors are in the immediate vicinity, and the adjacent lands are not high-use recreation areas.

For the Pah Rah area, because no development would occur at the Pah Rah parcel from implementing Alternative 2, it would not contribute to cumulative impacts on visual resources in that area.

4.18.4.5.4 Alternative 3. The differences in Alternative 3 design, when compared to the Proposed Action design, would result in landscape changes that are similar to, but not the same as the Proposed Action. The primary differences in landscape changes with this alternative, when compared with the Proposed Action, are the air-cooled condensers because they are the power plant feature having the greatest mass. Partially offsetting that greater visual change (due to the larger structures) are the fewer number of wells that would be required and the smaller evaporation and equalization ponds that would be needed for this alternative.

Although this alternative design is different from that of the Proposed Action and Alternatives 1 and 2, its overall visual impact to the landscape from its physical presence would be similar to that of the Proposed Action.

Although the landscape would be altered by implementation of Alternative 3 in combination with the Kern River 2003 Expansion Project, their implementation would not result in cumulative impacts on visual resources in the Toquop area. This is because views of the southern project site from the surrounding area are limited, views from I-15 are obstructed, no sensitive receptors are in the immediate vicinity, and the adjacent lands are not high-use recreation areas.

Because no development would occur at the Pah Rah parcel from implementing this alternative, there would be no effect on visual resources.

4.18.4.6 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers

4.18.4.6.1 Proposed Action.

Implementation of the Proposed Action would not contribute to cumulative impacts on Wilderness Areas, WSAs, or Wild and Scenic Rivers in the Lincoln County (Toquop parcel) or Washoe County (Pah Rah parcel) areas because no project features would be located in those areas.

Other than the 222 acres disturbed during construction of the access road passing through the Mormon Mesa ACEC

(65 acres net new impact following reclamation), there would be no other known effects on ACECs from the Toquop Energy Project or the nine interrelated projects (except for the Kern River Gas Pipeline) (see *Section 4.18.2, Description of Interrelated Projects*). The potential for cumulative effects on ACECs from other power plants appears to be very low to absent.

The Mormon Mesa ACEC would also be affected by the proposed crossing of the Kern River Expansion Project. The Kern Project is the closest project to the Toquop Project, both geographically and in time.

The EIS/EIR for the Kern Project indicated that the proposed pipeline would be located adjacent to the existing Kern pipeline within a designated utility corridor for the entire crossing of the ACEC and that impacts would be less than significant.

The Pah Rah parcel is not within a designated ACEC. Therefore, that project element (the land exchange) would not contribute to cumulative impacts on ACECs in the Washoe County area.

4.18.4.6.2 Alternatives 1, 2, and 3.

Cumulative impacts for Alternatives 1, 2, and 3 would be the same as those described for the Proposed Action.

4.18.4.7 Cultural and Historical Resources and Native American Religious Concerns

4.18.4.7.1 Proposed Action.

Cumulative impacts would be minimal for historic properties in the Proposed Action, both in combination with other neighboring projects (see *Section 4.18.2, Description of Interrelated Projects*) or over the 42-year estimated life span of the power plant. Review of previous cultural resources projects and records for a roughly 340-square-mile area encompassing the Proposed Action and alternatives (1-mile radius) was conducted to provide a research and cultural historical context for the project. While numerous surveys for linear projects have been conducted in this area, few resulted in cultural resources finds. Site counts are higher in the neighboring East Mormon Mountains, and extensive and regionally important archaeological remains are located in proximity to the Virgin River; however, sites in the project vicinity are infrequent and do not contain data sufficient to inform regionally important research questions about prehistoric or historical lifeways. The region in general possesses low cultural resources value. No future activities related to the Proposed Action, particularly increased vehicular and human traffic, would have cumulative effects on important cultural resources, although sites ineligible for the NRHP may be destroyed.

BLM has received various information from Indian tribes related to the Proposed Action. Some have expressed no concerns for the project, others have expressed concern for preservation of archaeological resources, and some have expressed concern for a property of traditional cultural and religious importance known as the Salt Song Trail. BLM has requested more specific information as to a location of the trail and project-related effects on religious practitioners, but has received no additional data. Hence, no analysis of cumulative impacts is possible. At least one tribe has expressed to BLM that this trail does not extend into the area of Proposed Action.

There are no project-related effects on the Pah Rah parcel, and thus, no cumulative effects.

4.18.4.7.2 Alternatives 1, 2, and 3. Cumulative impacts for Alternatives 1, 2, and 3 would be the same as those described for the Proposed Action.

4.18.4.8 Socioeconomics

4.18.4.8.1 Proposed Action. Both the Proposed Action and the nine interrelated projects planned in the Clark/Lincoln County region identified in *Section 4.18.2, Description of Interrelated Projects* would generate short-term and long-term employment, income, and tax base opportunities. These projects would also result in additional demand on police protection, fire protection, and emergency medical services.

Depending on the number of laborers required, the construction time frames of these projects, and the types of skills required by the laborers to construct these projects, it is possible that development in the Clark/Lincoln County area may require importing labor from outside the two-county area if a shortage of skilled laborers occurs. If laborers (construction or operation) are imported from outside the two-county area and they relocate to the Clark/Lincoln County area, then housing and associated infrastructure would be required for those workers and their families.

Employment opportunities for the workers (construction laborers and operations staff) would positively contribute to their personal earnings and to the revenues of the two counties. In addition, as more land is developed, more tax revenues would be generated for the Clark/Lincoln County area.

Because each project would likely generate construction jobs that would be temporary, the combined projects would not likely cause a change in the long-term unemployment rate of the region. However, additional employment opportunities in the Clark and Lincoln County areas are a benefit to the individuals employed and to the local economy, even if only for a short-term period.

Therefore, the Proposed Action, when combined with the other projects planned in the Clark/Lincoln County area, would contribute to cumulative socioeconomic impacts (both beneficial and adverse) in the two-county region. It should be noted, however, that the project's incremental addition to these cumulative impacts is minimal.

Because the proposed land exchange in the Pah Rah area would not result in impacts on Washoe County population, employment, unemployment, earnings and income, tax receipts, housing, and community infrastructure, it would not contribute to cumulative social and economic impacts in Washoe County.

4.18.4.8.2 Alternative 1. Alternative 1, when combined with the other planned projects in the two-county region, would contribute to cumulative socioeconomic impacts in the Clark/Lincoln County area, the same as those described for the Proposed Action. In addition, the contribution to cumulative impacts on the economy and community infrastructure from implementation of Alternative 1 would be the same as those described for the Proposed Action.

Because the proposed land exchange in the Pah Rah area would not result in impacts on Washoe County population, employment, unemployment, earnings and

income, tax receipts, housing, and community infrastructure, it would not contribute to cumulative social and economic impacts in Washoe County.

4.18.4.8.3 Alternative 2. Alternative 2, when combined with the other planned projects in the two-county region, would contribute to cumulative socioeconomic impacts in the Clark/Lincoln County area, similar to what was described for the Proposed Action. In addition, the contribution to cumulative impacts on the economy and community infrastructure from implementation of Alternative 2 would be similar to that described for the Proposed Action. Construction costs would be approximately 6 percent higher.

Because the proposed land exchange in the Pah Rah area would not result in impacts on Washoe County population, employment, unemployment, earnings and income, tax receipts, housing, and community infrastructure, it would not contribute to cumulative social and economic impacts in Washoe County.

4.18.4.8.4 Alternative 3. Alternative 3, when combined with the other planned projects in the two-county region, would contribute to cumulative socioeconomic impacts in the Clark/Lincoln County area, similar to those described for the Proposed Action. In addition, the contribution to cumulative impacts on the economy and community infrastructure from implementation of Alternative 3 would be similar to that described for the Proposed Action. Construction costs would be approximately 3 percent higher.

Because the proposed land exchange in the Pah Rah area would not result in impacts on Washoe County population, employment, unemployment, earnings and income, tax receipts, housing, and community infrastructure, it would not contribute to cumulative social and economic impacts in Washoe County.

4.18.4.9 Transportation

4.18.4.9.1 Proposed Action. As growth occurs in the southern Nevada region, additional vehicle trips will be generated along major freeways and local roadways. This project was assessed in light of other interrelated projects identified in *Section 4.18.2, Description of Interrelated Projects.*

The Kern River 2003 Expansion Project, which would cross the Toquop parcel and is expected to be constructed in November 2002 through January 2003 in the project area, would be the closest to the Toquop Project geographically but it would not overlap in time. The EIS/EIR for the Kern Project identified traffic congestion and roadside parking hazards as potential impacts during that project's construction. The transportation impacts were mitigated by measures that included requiring construction workers to be transported to the project site via buses provided by the contractor. The EIS/EIR indicated that the mitigation would reduce the impacts to less-than-significant levels.

There is no potential for a cumulative temporary impact on traffic flow at the East Mesa Interchange offramp during the projects' construction periods because the Kern Project and the Proposed Action would not be constructed concurrently. Construction of the Proposed Action is anticipated to begin between mid-2003 and the end of 2004, so no overlap between these two projects would occur.

As discussed above, the increased traffic from construction of the Proposed Action would be temporary and the increased

traffic from project operation would be very minor. Therefore, implementation of the Proposed Action would not contribute to cumulative impacts on traffic on I-15.

4.18.4.10 Alternatives 1, 2, and 3

There would be no cumulative impacts for Alternatives 1, 2, and 3 for the same reasons as described for the Proposed Action.

4.19 Unavoidable Adverse Impacts

Unavoidable adverse impacts are residual impacts after implementation of mitigation measures. Those unavoidable adverse impacts associated with the Toquop Energy Project and the Pah Rah/Toquop land exchange that would remain after mitigation are summarized in the following text.

4.19.1 Soils and Geology

Some biological soil crusts occur at the southern and possibly the northern power plant sites, along the western and eastern water pipeline corridors, and along the utility corridor. Some may be lost because of project construction.

4.19.2 Surface Water Hydrology

No unavoidable adverse impacts on surface water hydrology or quality would occur.

4.19.3 Ground Water Resources

The Proposed Action and Alternatives 1, 2, and 3 would result in localized temporary ground water level declines and ground water consumption in the Tule Desert Hydrographic Region.

4.19.4 Biological Resources

The Proposed Action and Alternatives 1, 2, and 3 would disturb desert tortoise habitat, habitat for other wildlife, and vegetative cover. Disturbed habitat would total 449 acres under the Proposed Action, 451 acres under Alternative 1, 581 acres under Alternative 2, and 417 acres under Alternative 3. On average, these acreages are estimated to provide habitat for 8 desert tortoises under the Proposed Action and Alternative 1, 10 desert tortoises under Alternative 2,and 7 desert tortoises under Alternative 3. Following reclamation, net new long-term disturbances would total 182 acres under the Proposed Action and Alternative 1, 237 acres under Alternative 2, and 150 acres under Alternative 3. On average, these acreages are estimated to provide habitat for three desert tortoises under the Proposed Action, Alternative 1, and Alternative 3, and four desert tortoises, under Alternative 2. Some residual unavoidable adverse effects on wildlife would potentially occur—including mortalities of unprotected reptile and small mammal species and habitat destruction during construction activities. No unavoidable adverse impacts on wetlands/riparian zones, floodplains, ephemeral washes, fisheries resources, or wild horses and burros would occur.

4.19.5 Air Quality and Noise

No unavoidable adverse impacts on air quality and noise would occur.

4.19.6 Visual Resources

Unavoidable adverse impacts would include the presence of construction vehicles, equipment, personnel, and activities, and associated fugitive dust

emissions during construction. Constructed project features would comply with the BLM's designated VRM Class III and Class IV of the Toquop area.

4.19.7 Recreation Resources

No unavoidable adverse impacts on recreation resources would occur.

4.19.8 Land Use, Prime or Unique Farmlands, and Rangelands

Under Alternative 2, the northern Toquop parcel would remove 640 acres of rangeland from the Garden Springs Allotment that is currently being managed for livestock use. This could result in a reduction of permitted grazing use of 46 AUMs.

4.19.9 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers

A net construction disturbance of 222 acres of habitat within the Mormon Mesa ACEC (a desert tortoise Special Management Area) from staging, widening, straightening, and paving the 14.4-mile-long access road from I-15 to the southern Toquop parcel would occur. Following reclamation, the net new long-term disturbance would be 65 acres.

4.19.10 Wastes, Hazardous and Solid

No unavoidable adverse impacts from hazardous or solid wastes would occur.

4.19.11 Cultural and Historical Resources and Native American Religious Concerns

No known direct unavoidable adverse impacts on cultural or historical resources would occur. Potential indirect unavoidable adverse impacts on these resources could result from increased human activity in the area and possibly increased OHV use.

4.19.12 Indian Trust Assets

No unavoidable adverse impacts on Indian Trust assets would occur.

4.19.13 Environmental Justice

No unavoidable adverse impacts on minority or low-income populations would occur.

4.19.14 Paleontological Resources

No unavoidable adverse impacts on paleontological resources would occur.

4.19.15 Socioeconomics

No unavoidable adverse impacts on economic variables or community infrastructure in the Clark/Lincoln County area would result from project construction or operation.

4.19.16 Transportation

Unavoidable adverse impacts on transportation would include traffic increases on I-15 and at the East Mesa Interchange during project construction.

4.20 Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

4.20.1 Introduction

For purposes of this discussion, "short-term" is defined as the approximate 2-year period during project construction and shortly thereafter during initial project operation. "Long-term" is defined as the entire operational life of the Proposed Action, Alternative 1, Alternative 2, or Alternative 3 which is estimated to be approximately 40 years. After this time the Toquop Energy Project would be decommissioned. Implementation of the Proposed Action, Alternative 1, Alternative 2, or Alternative 3 would necessitate uses of the environment whose effects would be apparent during project construction and operation, and which would result in both beneficial and adverse effects on long-term productivity.

Potential impacts associated with implementation of the Proposed Action, Alternative 1, Alternative 2, or Alternative 3 are discussed in *Sections 4.1* through *4.17* of this document. *Section 4.18* discusses cumulative impacts associated with the Proposed Action, Alternative 1, Alternative 2, or Alternative 3 when combined with proposed and/or anticipated projects. Unavoidable adverse impacts resulting from project construction and operation that would remain after implementation of mitigation measures are described in *Section 4.19* of this document. Many of the potential impacts described in *Sections 4.1* through *4.17* are either temporary in nature, not substantial in magnitude, or they would be mitigated to prevent the occurrence of unavoidable adverse effects. These use-related effects are briefly summarized in the following text, as are the effects on long-term productivity.

4.20.2 Short-Term Uses

Most impacts on environmental resources would initially result from construction activities and be temporary in duration, but others would persist for the operational life of the project. The range of these effects includes:

- Use of local soils, disturbance and some loss of biological soil crusts, and commitment of habitat during project construction and operation
- Increased erosion potential until disturbed areas are reclaimed
- Use of ground water during project construction and operation
- Disturbance and/or loss of habitat and/or vegetative cover used by desert tortoises, other species of wildlife, wild horses, recreationists, and livestock

Lands that would be disturbed and/or included in construction rights-of-way total approximately 449 acres under the Proposed Action, 451 acres under Alternative 1, 581 acres under Alternative 2, and 417 acres under Alternative 3. All of these lands are classified as desert tortoise habitat and, on average, would provide habitat for approximately 8 desert tortoises under the Proposed Action and Alternative 1 10 desert tortoises under Alternative 2, and 7 desert tortoises under Alternative 3. Following reclamation, net new long-term

disturbances would total 182 acres under the Proposed Action and Alternative 1 (habitat for 3 desert tortoises), 237 acres under Alternative 2 (habitat for 4 desert tortoises), and 150 acres under Alternative 3 (habitat for 3 desert tortoises). A net construction disturbance of 222 acres would result from access road improvement within the Mormon Mesa ACEC, which is a desert tortoise Special Management Area. Following reclamation, the net new long-term disturbance would be 65 acres.

Up to 7,000 acre-feet per year of ground water from the Tule Desert wellfield would be necessary to operate the Toquop Energy Project under the Proposed Action, Alternative 1, or Alternative 2. Up to 170 acre-feet per year of ground water would be necessary to operate the air-cooled power plant under Alternative 3.

Additional effects would result from short-term uses of the environment. Effects on air quality would primarily be short-term and localized, resulting from construction activities that create fugitive dust and vehicle and equipment engine emissions. Project construction and operation activities would impact the area's visual resources and ambient noise levels, but not substantially and not at levels that would affect recreationists' use and enjoyment of the project area or adjacent lands. Any cultural resources encountered during construction activities could be degraded or destroyed, unless they are fully mitigated as described in this document. Local and regional economies would benefit from the construction and operation of the proposed Toquop Energy Project, especially in Lincoln County because of increases in tax receipts resulting from the proposed project. No long-term adverse effects would result from transportation-related activities.

There would be no effects on geologic features, paleontological resources, Indian trust assets, environmental justice, or hazardous and solid wastes.

4.20.3 Maintenance and Enhancement of Long-Term Productivity

Long-term productivity related to the Proposed Action, Alternative 1, Alternative 2, or Alternative 3 includes long-term increases in the regional supply of reliable, electrical power at competitive costs for use by consumers to help meet shortages in the western United States. On a more local level, this includes an increased availability of electrical power for the State of Nevada and the Las Vegas area. The Proposed Action, Alternative 1, Alternative 2, or Alternative 3 would help meet short-term and long-term power requirements of existing regional population areas, both for residential and commercial/industrial uses. The direct and indirect economic benefits of project construction and operation and of increased power production would support or contribute directly to the long-term economic growth, both locally and regionally, and particularly in Lincoln County.

Long-term productivity also would be enhanced through the Pah Rah/Toquop land exchange. The Proposed Action, Alternative 1, Alternative 2, or Alternative 3 would provide the BLM a mechanism for acquiring a desirable parcel of private land in the Pah Rah Range in northwestern Nevada. The proposed land exchange would facilitate public land management by the BLM by creating contiguous tracts of land adjoining the Pah Rah parcel. Conversion to private ownership of a similarly valued section of

public land in Lincoln County on which the power plant would be located, and the construction of associated project facilities including the wellfield and linear infrastructure, would result in increased long-term power production. This land exchange would require short-term uses of the environment and affect the long-term productivity of several resources as summarized in *Section 4.20.2.*

4.21 Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of resources occurs if the commitment cannot be changed once made. An irretrievable commitment of resources occurs when resources are used, consumed, destroyed, or degraded during project construction, operation, and maintenance and cannot be reused or recovered for the life of the project or beyond. Table 4-22 summarizes irreversible and irretrievable commitments of resources for the Proposed Action, Alternative 1, Alternative 2, or Alternative 3. Determinations of whether or not there would be irreversible and irretrievable

TABLE 4-22
Irreversible and Irretrievable Commitments of Resources

Resource	Irreversible Impacts?	Irretrievable Impacts?*	Nature of Impact
Soils	Yes	Yes	See *construction materials and fuels* below
Geology	No	No	
Surface water	No	No	
Ground water	Yes	Yes	Used in construction, plant processes, and cooling operations
Threatened, endangered, and sensitive species	No	Project Life Span	Some harassment and/or loss of special status species and habitat
Vegetation and noxious weeds	No	Project Life Span	Disturbance and/or loss of vegetation and habitat
Wild horses and burros	No	No	
Wildlife and fisheries	No	Project Life Span	Some harassment and/or loss of wildlife species and habitat
Wetlands/riparian zones, floodplains, and waters of the United States	No	No	
Air quality	No	Project Life Span	Some minor degradation of air quality during construction and operation
Noise	No	Project Life Span	Noise exceeds ambient levels during construction and operation at a relatively minor level
Visual resources	No	Project Life Span	Relatively minor viewshed intrusion

TABLE 4-22
Irreversible and Irretrievable Commitments of Resources

Resource	Irreversible Impacts?	Irretrievable Impacts?*	Nature of Impact
Recreation resources	No	Project Life Span	Construction and operation areas unavailable for recreation to an minimal degree
Land use	No	Project Life Span	Loss of rangeland at the northern Toquop parcel would be compensated for financially
Wilderness Study Areas and Areas of Critical Environmental Concern	No	Project Life Span	Improved access road would pass through an ACEC
Hazardous and solid wastes	No	No	
Cultural resources	Yes	Yes	Potential disturbance if sites are inadvertently discovered during construction; destruction of known archaeological resources—none of which are eligible for the NRHP (except for one each under Alternatives 1 and 2) nor have they been identified to BLM by Native Americans as properties of traditional cultural or religious importance.
Indian Trust Assets	No	No	
Environmental justice	No	No	
Paleontological resources	No	No	
Socioeconomics	No	Project Life Span	Increased regional and local employment and revenues during construction and operation
Transportation	No	No	
Construction materials and fuels			
Sands and gravels	Yes	Yes	
Ground water	Yes	Yes	
Steel	Yes	Project Life Span	
Aluminum	Yes	Project Life Span	
Concrete	Yes	Yes	
Chemicals	Yes	Yes	
Wood	Yes	Project Life Span	
Natural gas	Yes	Yes	

*"Project Life Span" indicates an irretrievable impact would extend through project construction and operation. "Yes" indicates impact duration would be forever.

commitments of environmental resources were based on discussions of direct and indirect project effects in *Sections 4.1* through *4.17* of this document and discussions of cumulative project effects in *Section 4.18*. As summarized in *Section 4.19*, very few of those effects would result in adverse impacts on environmental resources.

4.22 Energy Requirements and Conservation Potential

Energy requirements under the Proposed Action, Alternative 1, Alternative 2, and Alternative 3 for project construction, operation, and maintenance activities would include the use of the following:

- Petroleum products (diesel, gasoline, oil, and grease)
- Various building, operations, and maintenance materials such as aggregate from borrow areas, water from the Tule Desert wellfield, steel, aluminum, concrete, and wood

Other energy requirements would include the use of natural gas from the Kern River Gas Pipeline for fueling the power plant's combustion turbine generators, and the use of various chemicals for treating power plant condensate and circulating water. These basic energy requirements cannot be determined specifically for each alternative because of the variability of potential actions. Except for ground water requirements during plant operation, the Proposed Action, Alternative 1, and Alternative 3 would be expected to have the lowest and similar energy requirements. Alternative 2 would potentially have the greatest energy requirements because of the construction of the electric transmission and natural gas lines and the extension of the access road into the northern power plant site. For these reasons, the conservation potential (except for ground water requirements) would be greater under the Proposed Action, Alternative 1, and Alternative 3 than under Alternative 2. The potential for ground water conservation would be substantially greater under Alternative 3 than under the Proposed Action, Alternative 1, or Alternative 2. The No Action Alternative would have no project-related energy requirements.

4.23 Monitoring

The monitoring programs described below are included as part of this project.

4.23.1 Toquop Land Disposal to the Caliente MFP Amendment

Monitoring and evaluation would be conducted at 5-year intervals for the Caliente MFP. These data would be used to determine the effectiveness of the plan amendment in achieving the desired results; to ensure that Best Management Practices (BMPs), Standard Operating Procedures (SOPs) and mitigation measures are satisfactory; and to ascertain whether changes have occurred in related plans of other federal, state, or local governments. Any information gained would be incorporated into future planning, including other amendments or revisions to the Caliente MFP.

4.23.2 Ground Water

A ground water monitoring plan will be developed as part of the wellfield design. This plan, which will incorporate the monitoring components of the agreement between Lincoln County/Vidler Water Company and the National Park Service,

will assess changes in water levels downgradient from the production wells. Its purpose is to determine the extent of any ground water cones of depression that could result from operation of the production wells. In addition, the Tule Desert well, which is the only existing well in the Tule Desert, will be monitored to assess any changes in ground water levels.

The ground water levels in the Tule Desert will be monitored and any major decline in ground water level in the Tule Desert downgradient of the wellfield will be assessed with respect to its potential consequences to ground water conditions in the Virgin River Valley.

At least one monitoring well will be installed south of the southernmost production well. The amount of disturbed area associated with this well will be approximately 1 acre. Ground water monitoring will also occur within the wellfield, with monitoring wells installed within the appropriate vicinity of the production wells to assess trends in water level change. The monitoring wells associated with the wellfield are not anticipated to add to the area of disturbed land already accounted for in assessing the number and location of the production wells.

4.23.3 Evaporation Pond

A leak detection system at the evaporation pond will be installed and operated in accordance with the requirements and guideline established by the Nevada Division of Environmental Protection, Bureau of Water Pollution Control. The effectiveness of the leak detection system will be monitored.

A monitoring plan also will be developed to monitor and document water quality and the degree of use by waterfowl of the evaporation pond, and to assess the timing of installation and effectiveness of protective measures.

4.23.4 Air Quality

Continuous Emission Monitoring Systems (CEMS) will be installed for each combustion turbine/duct burner stack to measure NOx and O_2 concentrations and fuel flow rate, and to record the concentration and mass flow rate of NOx. Either parametric monitoring will be used to verify that the turbines are operating in a range where good combustion practice would be assured, or CEMS will be used to monitor emissions of CO and other pollutants. Periodic sampling of fuel, in accordance with a custom fuel monitoring schedule as approved by NDEP, will be used to monitor SO_2 emissions from the combustion turbines and duct burners.

In addition initial compliance testing will be required for NOx, SO_2, CO, PM10, and VOCs. This will be performed by collecting and analyzing actual stack gas samples for the purpose of verification of full load emission rates versus permitted levels. For NOx, these data will also be used to verify accuracy of the CEMS, and testing at multiple turbine load conditions will be required for NOx.

4.23.5 Reclamation

A plan will be developed to monitor the success of reclamation and revegetation required by desert tortoise habitat and general reclamation commitments made in *Appendixes A and B*.

4.23.6 Stormwater

Monitoring and maintenance of the stormwater elements at the Toquop Power Plant site will be conducted to ensure long-term effectiveness of the management system.

4.23.7 Cultural Resources

Monitoring of potential impacts to cultural resources during construction will be conducted in accordance with the Programmatic Agreement (*Appendix C*).

Chapter 5
Consultation and Coordination

Chapter 5.0 Consultation and Coordination

5.1 Introduction

National Environmental Policy Act (NEPA) regulations provided by the Council on Environmental Quality (CEQ) require the involvement of agencies and the general public during the preparation and review of Environmental Impact Statements (EISs). This chapter documents coordination and consultation that has occurred with agencies, Native Americans, and the public during scoping for the proposed project, during public meetings on the Draft EIS (DEIS), and during preparation of this Final EIS (FEIS). This chapter also identifies agencies and the public who provided comments on the DEIS. Appendix I contains those comments and BLM's responses.

5.2 Public Scoping

Scoping is the process of learning the concerns of individuals, organizations, and agencies regarding a proposed project. Scoping is an integral part of the NEPA review process because it allows interested parties to participate in developing a list of issues that will be discussed in an EIS. Public scoping for the MFP Amendment/ Toquop Energy Project EIS was comprised of three separate scoping efforts:

- Scoping for the Pah Rah/Toquop Land Exchange Environmental Assessment—Conducted by the BLM during July 2001
- Scoping for the Toquop Energy Project Environmental Impact Statement (EIS)—Conducted by the BLM during July and August 2001
- Scoping for the combined Toquop Energy Project and Pah Rah/Toquop Land Exchange EIS, requiring an amendment to the Caliente Management Framework Plan—Conducted by BLM during November and December 2001

5.2.1 Public Scoping for the Pah Rah/Toquop Land Exchange

Public scoping meetings were held on July 10, 2001, in Mesquite, and July 11, 2001, in Reno. The meetings were conducted using an open-house format. BLM representatives posted maps showing the exchange parcels, provided photographs of the sites, and discussed concerns with individuals. The Mesquite meeting was attended by 14 individuals and the Reno meeting was attended by 11 individuals. The meetings were advertised through notices in the Mesquite, Lincoln County, and Reno newspapers and individual mailings.

Concerns voiced at the meetings were summarized in a memorandum dated July 20, 2001. Written comments were also submitted to the BLM after the meetings. Most of the commentors were not in favor of the land exchange, and those that did not state a position had questions about particular impacts. The number of comments provided in each resource category were as follows (from highest number of comments to lowest):

- Wildlife habitat, or general habitat concerns: 6 comments
- Cultural and historical resources: 4 comments

- Economic value of land: 3 comments
- Water development: 2 comments
- Visual resources: 1 comment
- Recreation: 1 comment
- Other concerns: 4 comments
  - Combine land exchange and power plant NEPA process: 2 comments
  - Mapping is inaccurate: 1 comment
  - Land exchange is not valid under regulations: 1 comment

5.2.2 Public Scoping for the Toquop Energy Project

Public involvement for the Toquop Energy Project was initiated with public information meetings held in Caliente, Nevada, on July 11, 2001, and Mesquite, Nevada, on July 12, 2001. These meetings were advertised in the local newspapers in Lincoln County, Mesquite, and Las Vegas, as well as in individual mailings.

The Notice of Intent (NOI) to prepare the EIS on the Toquop Energy Project was published in the *Federal Register* on July 22, 2001. Notice of a public meeting was advertised in the NOI; in local newspapers in Lincoln County, Mesquite, and Las Vegas; and in individual mailings. A public scoping meeting was held in Las Vegas on August 15, 2001.

An open-house format was used at each meeting where project and BLM representatives presented project information on display boards and handouts, and discussed concerns with individuals. The Caliente meeting was attended by 14 people, 39 people attended the Mesquite meeting, and 25 attended the Las Vegas meeting.

Concerns voiced at the meetings were written on flip charts. Written comments were also submitted to the BLM during and after the meetings. Comments fell into three broad categories, each of which is described below:

- Those in favor of the project
- Those who are concerned about the potential impacts of the project
- Those who did not state a position, but if the project happens, want local union labor to be employed

5.2.2.1 Favor the Project

Three of the commentors favored the project, indicating that the site would not have serious environmental consequences.

5.2.2.2 Concerned About the Potential Impacts of the Project

Many commentors were concerned about potential impacts or suggested questions that should be answered in the DEIS. The number of comments provided in each resource category were as follows (from highest number of comments to lowest):

- Water development, use, and ground water impacts: 16 comments
- Habitat, wildlife, ACEC, and WSA concerns: 15 comments
- Air quality: 4 comments
- Economic value of land for exchange: 1 comment
- Noise : 1 comment
- Soils: 1 comment

- Economics (tax contribution not enough to cover ecological costs): 1 comment

- Other concerns: 6 comments, as listed below:
  - Combine land exchange and power plant NEPA process: 1 comment
  - Mesquite and Clark County would get pollution but no economic boost: 1 comment
  - Lack of comprehensive plan for the power plant: 1 comment
  - No Arizona or Mohave County officials informed of project: 1 comment
  - Evaluate cumulative effects of all proposed power plants: 1 comment
  - Provide complete index of all generation due to come on line and the expected rolling blackouts to determine project need: 1 comment

5.2.2.3 Local Union Labor for Project

Many of those who attended the public meetings were concerned that if an out-of-state company were selected to construct the Toquop Energy facility, the chosen firm would bring in out-of-state workers to build the plant. Ten people submitted written comments that local union labor should be used. Although it was not within the scope of the DEIS to dictate what labor force would be used to build the plant, the evaluation of socioeconomic resources in the DEIS addressed this topic.

5.2.3 Public Scoping for the Toquop Land Disposal Amendment to the Caliente MFP/Toquop Energy Project

In reviewing the comments received during the two scoping processes described above, the BLM determined that calls to combine the two NEPA processes had merit. It was also determined that the Pah Rah/Toquop Land Exchange required an amendment to the Caliente Management Framework Plan. Consequently, the decision was made to combine these actions into a single EIS and to reopen the scoping process for the expanded project.

The NOI to prepare an EIS for the Toquop Land Disposal Amendment to the Caliente MFP/Toquop Energy Project was published in the *Federal Register* on November 7, 2001. The Notice was also published in local newspapers in Lincoln County, Mesquite, and Las Vegas. The public comment period closed on December 7, 2001. The scoping process for both the Pah Rah/Toquop Land Exchange EA and the Toquop Energy Project EIS included public scoping meetings. The BLM determined that further public scoping meetings were duplicative and unnecessary for the expanded EIS.

Fifteen comment letters were received. The following issues were identified:

- Consider an air-cooled plant as an alternative (3 comments)

- Concern over impacts of ground water withdrawal on surface water and fish and wildlife (9 comments)

- Concern over air quality impacts (4 comments)

- Concern over compliance with NEPA, Land Exchange Rules, and state statutes (7 comments)

- Impacts to cultural resources (2 comment)

- Impacts to natural resources from facilities (2 comments)

- Concern over comparable values of the parcels involved in the land exchange (4 comments)

5.3 Coordination During MFP Amendment/Toquop Energy Project DEIS Development

5.3.1 General Consultation

The agencies and Indian Tribes listed below were consulted during the preparation of the DEIS. Specific references citing individuals, as appropriate, are provided in the text of this document. Agencies and Indian Tribes consulted include the following:

- Federal
  - Bureau of Land Management, Ely Field Office, Nevada
  - Bureau of Land Management, Carson City Field Office, Nevada
  - Bureau of Land Management Las Vegas Field Office, Nevada
  - Natural Resources Conservation Service
  - Fish and Wildlife Service (FWS), Las Vegas Office, Nevada
  - National Park Service (NPS), Denver, Colorado
  - Bureau of Indian Affairs

- State
  - Nevada Division of Wildlife (NDOW), Reno, Nevada
  - Nevada Department of Transportation
  - Nevada Public Utility Commission (NPUC)
  - Nevada State Historic Preservation Office
  - Nevada Division of Environmental Protection (NDEP), Reno, Nevada—Water Pollution Control Bureau
  - Nevada Division of Environmental Protection—Air Quality Bureau
  - Arizona Department of Environmental Quality—Division of Air Quality
  - Utah Department of Environmental Quality—Division of Air Quality
  - Nevada Division of Water Resources

- County
  - Lincoln County Planning Department
  - Clark County Department of Air Quality Management
  - Lincoln County Sheriff's Department
  - Washoe County Department of Community Development
  - Clark County Department of Comprehensive Planning

- Indian Tribes
  - Moapa Band of Paiutes
  - Paiute Indian Tribe of Utah
  - Shivwits Band (Utah)
  - Las Vegas Paiute Tribe
  - Kaibab Paiute Tribe (Arizona)

5.3.2 Native American Consultation

Native American consultation occurred initially in relation to a land exchange proposal, now an alternative component of the Toquop Energy Project. Consultation with American Indian tribes also was initiated specifically in regard to the Toquop Energy Project itself.

5.3.2.1 Pah Rah-Toquop Wash Land Exchange

The Bureau of Land Management (BLM), Carson City Field Office, initiated consultation with Native Americans regarding the proposed Pah Rah-Toquop Wash land exchange on October 25, 2000. Letters went to Chairpersons of the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, and the Shivwits Band (Utah), all representatives of the ethnographic Southern Paiute who inhabited the Toquop Wash area at the time of historic contact. The letter described the specific location of public land in Lincoln County (T11S, R69E, Section 36) and gave a general location for the offered private land in Washoe County. Each tribe was asked for comments regarding cultural values, issues or concerns, and to identify any other persons or groups who should be informed of the proposed land exchange. Subsequently, telephone calls were made to Chairpersons to initiate data collection about Native American concerns. At the request of the tribes, two other groups (Las Vegas Paiute Tribe, Kaibab Paiute Tribe) and one individual (Richard Arnold, Pahrump, Nevada) were informed of the project and asked for statements of any concern. Efforts also have been made to help ensure that newly elected tribal Chairpersons were informed of the project as BLM learned of their elective status.

Tribes expressing interest in consultation included the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, and the Shivwits Band, while the Las Vegas Paiute Tribe responded that they did not desire involvement in the consultation process; no responses were received from the other tribe or individual. The Paiute Indian Tribe of Utah responded in a letter of December 11, 2000, expressing concerns about possible project-related effects on the Salt Song Trail. The Paiute Indian Tribe of Utah also requested a better map and requested an ethnographic study. The Chair and another member of the Moapa Band of Paiutes made a field examination of the Toquop Wash parcel in January 2001. Representatives of the Paiute Indian Tribe of Utah and the Shivwits Band, and again the Chair of the Moapa Band of Paiutes, also made a field visit that same month. Examples of known archaeological resources were visited, and the Salt Song Trail was discussed generally. The BLM maintained telephone contact in ensuing weeks and months in an effort to establish whether the tribes' concerns for possible effects on the Salt Song Trail were any different after the field inspection. However, no response was received.

In June 2001, the BLM sent a letter and consultation summary to the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, the Shivwits Band, the Las Vegas Paiute Tribe, the Kaibab Paiute Tribe, and Richard Arnold. The BLM letter conveyed results of the cultural resources inventory, as well as the BLM's conclusion that no tribe had identified the Salt Song Trail or related sites as being within the Toquop Wash land exchange parcel, and that no tribe had identified any possible effects to the Salt Song Trail if the proposed exchange were implemented.

In July 2001, the newly elected Chairperson of the Moapa Band of Paiutes expressed concerns in a public scoping meeting held in regard to the proposed land exchange. A specific concern was expressed for the Salt Song Trail, which was identified by the chairman as a sacred site. A general location was given to the BLM representative. The Salt Song Trail was described as a trail along which ancestral spirits move as songs are sung by

contemporary members of the Moapa Band of Paiutes (and perhaps other persons as well). No information was received as to how or whether the contemporary practitioners physically utilize the proposed project area in conducting their sacred rituals. The chairman asserted that the spirits' movements might be hindered or precluded by projects such as the proposed land exchange and developments that would occur there. In July 2001, the BLM sent letters to the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, and the Shivwits Band restating the BLM's need for a more specific location of the Salt Song Trail with relation to the proposed Toquop Wash land exchange parcel. The BLM also indicated the need for information as to how the proposed land exchange action would affect the significance, use, or integrity of the Salt Song Trail. No responses have been received to date.

Northern Nevada tribes were asked for any expressions of concern for the offered private land in Washoe County, in the Pah Rah Range. BLM opened formal communication with the Washoe Tribe of Nevada and California, the Pyramid Lake Paiute Tribe, and the Reno-Sparks Indian Colony in January 2001. The first made an onsite field visit by a tribal elder and the Washoe Tribe's cultural resources coordinator, while the tribal chairmen of the other two made visual inspections. No concerns were expressed about potential effects of the proposed land exchange.

5.3.2.2 Toquop Energy Project

The BLM, Ely Field Office, initiated consultation regarding the proposed Toquop Energy Project in December 2001 with Chairpersons of five tribes, including the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, the Shivwits Band (Utah), the Las Vegas Paiute Tribe, and Kaibab Paiute Tribe. The tribes were asked if they had any cultural values, issues, or concerns that might be affected by the proposed action. The BLM, Ely Field Office, had also initiated contact in November 2001 in a monthly tribal coordination meeting attended by the Ely Shoshone Tribe. No concerns were expressed in that meeting. The letters were followed by telephone calls to continue data collection.

Most initial calls were made in December 2001 to tribal Chairs, while one (to the Moapa Band of Paiutes) was made in January 2002 after the outcome of a tribal Chair election late in December 2001. Telephone contact was made with the Chairpersons of the Paiute Indian Tribe of Utah, the Moapa Band of Paiutes and the Shivwits Band. Telephone contact was also made with the Tribal Attorney for the Las Vegas Paiute Tribe and with a cultural resources specialist in the Natural Resources Division of the Kaibab Paiute Tribe. In two cases, the tribes contacted by telephone requested copies of the original certified letters which were resent by facsimile transmission. In one case, the original certified letter had been undeliverable so the facsimile copy was sent.

The Paiute Tribe of Utah initially expressed interest in continued consultation but ultimately indicated it had no concerns about the project. The Shivwits Band indicated that: 1) it was concerned about the preservation of archaeological sites; and 2) that, based on information from its members who made the on-site inspection in January 2001, the Salt Song Trail did not extend as far as the project area. The Las Vegas Paiute Tribe had no concerns about the project. No

additional information has been received from either the Moapa Band of Paiutes or the Kaibab Paiute Tribe.

5.4 Request for Comments on the Draft Caliente MFP Amendment/Toquop Energy Project DEIS

5.4.1 Distribution

Through the consultation and coordination process, interested parties can review and comment on the substantive issues presented in the DEIS and other study documents. The DEIS was sent to, and comments requested from, the members of the public and other individuals who attended public meetings. It was also sent to the entities listed below.

Federal Government

Arizona Strip Field Office, BLM
Battle Mountain Field Office, BLM
Bureau of Indian Affairs
Caliente Field Station, BLM
Carson City Field Office, BLM
Cedar City Field Office, BLM
Dixie Field Office, BLM
Ely Field Office, BLM
Las Vegas Field Office, BLM
National Park Service
Natural Resources Conservation Service
Nevada State Office, BLM
St. George Field Office, BLM
U.S. Air Force
U.S. Army Corps of Engineers
U.S. Bureau of Mines
U.S. Bureau of Reclamation
U.S. Department of Energy
U.S. Department of Interior
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey
U.S. National Park Service

State Government

Nevada Commission for the Preservation of Wild Horses
Nevada Division of Agriculture
Nevada Division of Conservation District
Nevada Division of Environmental Protection
Nevada Division of Minerals
Nevada Division of State Lands
Nevada Division of State Parks
Nevada Division of Water Resources
Nevada Division of Wildlife
Nevada Grazing Advisory Board
Nevada Indian Commission
Nevada Legislative Committee on Public Lands
Nevada Natural Heritage Program
Nevada State Clearinghouse
Nevada State Historic Preservation Office
Nevada Wildlife Commission

Local Governments

Alamo Town Board
City of Caliente
City of Mesquite
City of Reno
City of Sparks
Clark County Commission
Enterprise City Advisory Council
Lincoln County Commission
Lincoln County Conservation District
Lincoln County Game Board
Lincoln County Public Lands Commission
Pioche Town Advisory Board
Truckee Meadows Regional Planning Commission
Washoe County Commission

Tribal Governments

Kaibab Paiute Tribe (Arizona)
Las Vegas Paiute Tribe

Moapa Band of Paiutes
Paiute Indian Tribe of Utah
Pyramid Lake Paiute Tribe
Reno-Sparks Indian Colony
Shivwits Band (Utah)
Washoe Tribe of Nevada and California
Yerington Paiute Tribe

Other Organizations

American Land Conservancy
Animal Protection Institute
Audubon Society
Best in the Desert
Center for Biological Diversity
Coalition for Nevada's Wildlife
Desert Research Institute
Fraternity of Desert Bighorn
Friends of Nevada Wilderness
Groundshaker Motorcycle Club
Lincoln County Power
Mineral Policy Center
Mojave-Southern Great Basin Resource Advisory Council
Motorcycle Racers Association of Southern Nevada
Mule Deer Foundation
Native American Heritage Commission
Natural Resources Defense Council
Nature Conservancy
Nevada Bell
Nevada Bighorns Unlimited
Nevada Cattlemen's Association
Nevada Conservation League
Nevada Indian Environmental Coalition
Nevada Mining Association
Nevada Outdoor Recreation Association
Nevada Power Company
Nevada Wilderness Association
Nevada Wilderness Project
Nevada Wildlife Federation
Nevada Woolgrowers Association
Northern Nevada Native Plant Society
Overton Power District
Paiute Pipeline Company
People for the USA
Sierra Club
Sierra Pacific Power Company
Silverdust Racing Association
Southern Nevada Off Road Racing Enthusiasts
Southern Nevada Water Authority
State Multiple Use Advisory Commission for Federal Lands
Trust for Public Land
Virgin Valley Water District
Western Land Exchange
Wild Horse Organized Assistance
Wilderness Society
Wildlife Society, Nevada Chapter
Williams Gas Pipeline
Wyoming Advocates for Animals

Governmental Officials

Shelley Berkley, U.S. House of Representatives
Marcia DeBraga, Nevada State Assembly
John Ensign, U.S. Senate
James A. Gibbons, U.S. House of Representatives
Kenny Guinn, Governor
Mike McGinnis, Nevada State Senate
Harry M. Reid, U.S. Senate

5.4.2 Availability

Copies of the Draft MFP Amendment/Toquop Energy Project DEIS were available for public inspection at the BLM offices listed below.

Bureau of Land Management
Caliente Field Station
U.S. Highway 93
Caliente, NV 89008-0237

Bureau of Land Management
Carson City Field Office
5665 Morgan Mill Road
Carson City, NV 89701

Bureau of Land Management
Ely Field Office
702 North Industrial Way
Ely, NV 89301-9408

Bureau of Land Management
Nevada State Office
1340 Financial Boulevard
Reno, NV 89502-7147

Bureau of Land Management
Washington Office of Public Affairs
18th and C Street, N.W.
Washington, D.C. 20240

Copies of the Draft MFP Amendment/ DEIS were available for public inspection at the libraries listed below.

Caliente Branch Library
P.O. Box 306
Caliente, NV 89008

Clark County Library
1401 East Flamingo Road
Las Vegas, NV 89109

Las Vegas Public Library
1726 East Charleston Boulevard
Las Vegas, NV 89104

Lincoln County Library
P.O. Box 330
Pioche, NV 89043

Mesquite Library
121 West 1st North Street
Mesquite, NV 89027

North Las Vegas Library
2300 Civic Center
North Las Vegas, NV 89030

Panaca High School Library
P.O. Box 268
Panaca, NV 89042

University of Nevada-Las Vegas
James R. Dickinson Library
Documents Department
4505 South Maryland Parkway
Las Vegas, NV 89154

University of Nevada-Reno
Getchell Library
Government Publication Dept.
Reno, NV 89507

Washoe County Library
301 South Center Street
Reno, NV 89501

White Pine County Library
950 Campton Street
Ely, NV 89301

5.5 Request for comments on the Notice of Exchange Proposal ("NOEP")

5.5.1 Purpose

BLM must publish a NOEP upon entering into an Agreement to Initiate an Exchange (ATI) with a land exchange proponent. BLM signed an ATI with NLRC on April 22, 2002, for this proposed land exchange. The NOEP serves the following three purposes:

- Advises the public of the opportunity to participate in the NEPA process by inviting comments on the land exchange proposal
- Notifies all authorized users and others who may have interests in or claims against the properties
- Provides notice to jurisdictional state and local governments and the congressional delegation

5.5.2 Distribution

The NOEP was published weekly for 4 consecutive weeks in local newspapers serving the Mesquite area, and both Lincoln and Washoe County, Nevada. In addition, the NOEP was sent to, and comments requested from the members of the public and other individuals who attended public meetings and to those entities similarly listed in *Section 5.4.1, Distribution.*

5.6 Public Meetings

Four public meetings were held during the public comment period (May 31 to August 29, 2002) to receive comments on the DEIS. Dates and locations of these meetings, and the number of attendees, are as follows:

Caliente, Nevada (6 Attendees)

Date: July 8, 2002

Time: 7:00 to 9:00 p.m.

Location: Caliente City Hall
100 Depot Avenue
Caliente, Nevada

Las Vegas, Nevada (15 Attendees)

Date: July 9, 2002

Time: 7:00 to 9:00 p.m.

Location: BLM
Las Vegas Field Office
4701 Torrey Pines Drive
Las Vegas, Nevada

Mesquite, Nevada (3 Attendees)

Date: July 10, 2002

Time: 7:00 to 9:00 p.m.

Location: Mesquite City Hall
Training Rooms A and B
10 East Mesquite Boulevard
Mesquite, Nevada

Reno, Nevada (4 Attendees)

Date: July 11, 2002

Time: 7:00 to 9:00 p.m.

Location: Airport Plaza Hotel
1981 Terminal Way
Reno, Nevada

5.7 Coordination During MFP Amendment/Toquop Energy Project FEIS Development

This FEIS has been developed through continued coordination efforts among the BLM and many of the entities listed in *Section 5.3.1, General Consultation.* The U.S. Army Corps of Engineers (USACE) requested and was granted cooperating agency status for this FEIS. Jurisdictional delineations of waters of the United States were reviewed by Grady McNure of the USACE during a site visit / consultation on November 14, 2002. The Nevada Division of Environmental Protection, Bureau of Water Quality, was consulted on December 5, 2002, to confirm permits necessary for crossing and/or discharging to waters of the State and State-USACE jurisdictional responsibilities. Coordination efforts were directed by the Ely Field Office of the BLM, and were supported by the Carson City and Las Vegas Field Offices of the BLM. Meetings were held among the various entities and with the project proponent, and correspondence was exchanged to discuss and resolve issues and concerns identified by the public during meetings and in their written comments on the DEIS. A noteworthy outcome of this coordination and consultation process and of public comments on the DEIS is the presentation and analysis of an additional action alternative (Alternative 3) in this *Proposed Toquop Land Disposal Amendment to the*

Caliente MFP and FEIS for the Toquop Energy Project. Alternative 3 is an air-cooled, rather than a water-cooled, power plant.

5.7.1 Public Comments on the DEIS

The public comment period opened with the announcement of the availability of the Draft MFP Amendment/Toquop Energy Project EIS in the Federal Register on May 31, 2002. Public comments on the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* were accepted until August 29, 2002. Four public meetings were held in July 2002, as described in *Section 5.5, Public Meetings,* and were attended by 28 people. The BLM received 159 separate pieces of correspondence containing comments on the DEIS during the comment period. Comments were received from three federal agencies, four state agencies, two local agencies, three interest groups, and 147 citizens. Table 5-1 lists the entities and individuals offering comments on the DEIS. In addition, the BLM received five letters on the Notice of Exchange Proposal (NOEP) for the land exchange, and those letters were considered in the preparation of this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project.*

Appendix I contains copies of the comment letters on the DEIS and the BLM's responses to those comments. Each comment letter was assigned a reference number and reviewed. Each comment on the DEIS in the letter was identified with a number. The response to each comment is numbered with the same number as the comment and printed next to or near the comment letter in Appendix I. Responses were prepared for comments that presented new data, raised new issues, or disagreed with the impact conclusions. Where appropriate, changes or additions are reflected in the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* to respond to comments.

5.8 List of Preparers and Reviewers

Early in the NEPA process, an interdisciplinary team (EIS ID Team) was formed within the lead agency to provide guidance and direction for preparing the EIS. The EIS ID Team members are listed in Table 5-2. Table 5-3 lists the EIS Core Team members, which represented the BLM Ely Field Office, Toquop Energy, Nevada Land and Resource Company, and CH2M HILL. The purpose of the EIS Core Team was to review interim work products to EIS preparation and to work through specific issues related to EIS preparation. Table 5-4 identifies reviewers from the BLM State Office, the BLM Carson City and Las Vegas Field Offices. Table 5-5 identifies the EIS Consultant Team, which was responsible for preparing the DEIS and this *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project.*

TABLE 5-1
Comment Letters on the Draft MFP Amendment/EIS

Reference Number	Source of Letter: Commenter	Source of Letter: Agency
	Federal Agencies	
F1	Lisa Hanf	U.S. Environmental Protection Agency
F2	Trish Riley	U.S. Geological Survey
F3	Grady McNure	Corps of Engineers, Sacramento District
	State Agencies	
S1	Carl Barrick	Nevada State Department of Water Resources
S2	Joesph Del Grosso	Nevada Division of State Lands
S3	Rebecca Palmer	Nevada State Historic Preservation Office
S4	Doug Hunt	Department of Conservation and Natural Resources
	Local Agencies	
L1	Kay Brothers	Southern Nevada Water Authority
L2	Michael Winters	Virgin Valley Water District
	Interest Groups	
G1	Rose Strickland	The Toiyabe Chapter of the Sierra Club
G2	Christopher Krupp	Western Land Exchange Project
G3	Katie Fite	Committee for Idaho's High Desert
	Citizens	
C1	John Link	
C2	Shirley Taylor	
C3	Robert Nard	
C4	John Torok	
C5	John Sutherland	
C6	Charles Hancock	

TABLE 5-1
Comment Letters on the Draft MFP Amendment/EIS

Citizen's Form Letter

C7	**Don Oliver**	**This same letter was submitted individually by 140 people. The signatures on 8 of the letters were completely illegible. All others are listed below.**		
	A.J. Ledezma	Donald C. Perry	Jim Rogari	Robert G. Miller
	Aaron W. Cheinor	Doug Housemen	Joe Carlin	Robert Gang
	A(illegible) Pasqualott	Edward Collins	Joe Maestas	Robert Kye
	Albert D. Carroll	Edward Genning	Kenneth Ruth	Robert L. Moorman
	Albert T. McKinney	Elaine Solzaner	Kenneth Troy Jensen	Ronald D. Johnson
	Ansil Aleong	Emil Yarbrough	Kevin Francis	Ronald V(illegible)
	B. (illegible)	Frederick W. True Jr.	Kevin Hinricksen	Ross Kitchen
	Barbara D. Gryder	Gary Gardner	Kevin Paramorr	Scott M. Freebairn
	Ben Grad	Gary M(illegible)	Larry F(illegible)	Scott N. Cameron
	B(illegible) Co(illegible)	Gary P. Thomsen	Lary D. Linville	Seth (illegible)
	Bobby E. Jamson	Gilbert Medina	Lori K. Claytom	Sidney Mitchell
	Bobby Lee (illegible)	Glenn Cadurell	Majilla D. Aspiras	Sigifredo Veloz
	Bonnie C(illegible)	Gordon Jackson	Mario N. Aspiras	Stephen L. Tichenor
	Bruce G. Ayer	Greg F(illegible)	Mark Carruth	Steve L. (illegible)
	C. Bookland	Greg Millisor	Mark J. Ashburn	Steve Schmitz
	C.W. Ramsey	Guadalupe Ponce	Martin Reed	Terry R. Larce
	Charles T. Stetson	Gustavo Lopez	Mat McLay	Thomas G. Connors
	C(illegible) E. C(illegible)	Harvey J. Ellison Jr.	Mathew Thomas	Thomas J. Surowiec
	Clifford B. Cihok Jr.	Hillary Holmes	Matt K(illegible)	Thomas Lawler
	Conrad W. Peel	Horace G. Smith, Jr.	Michael J. Harding	Timothy C. Powell
	Courtney Cole	(illegible) Cairnello	Michael T. Weinner	Tina L. Allen
	Crystal Lee Colvin	(illegible) Hadden	Michael Zielu (?)	Todd A. Williamson
	D. Scott Gossard	(illegible) Holz	Mike Ardoin	Tony Torres
	Dale T. Walsh	(illegible) X. (illegible)	Norman Benally	Troy Crooks
	Dalen Clayton	James A. Dinkfeld	Ralph D. Danise	Vernon L. Bradley
	Daniel F. Gryder	James Corpuz	Raymond D. Battiste	Virgil Whitaker
	Darin L. Ammer (illegible)	James Cozby	Reed Hahn	William A. Poma
	David R. Jones	James E. Kennedy	Ricardo L. Torrez	Robb L. Thompson
	David R. Thrush	James P(illegible)	Richard B. Lucas III	Jerry Lenox
	David Riggio	Jason Lockwood Jr.	Richard J. Auina	Donald Austin
	David S. Baker	Jason Sprigg	Rick J. Boy (?)	R(illegible) (illegible)
	David Sondin	Jeff Carothers	Rick Marsaw	Jennifer Chatham
	Dexter D. Lee	Jeffrey May	Ricki A. Casaday	Don Fletcher

TABLE 5-2
BLM EIS ID Team

Organization	Team Member	Role
Bureau of Land Management (EYFO)	Brenda Linnell	Realty Specialist/Rights-of-Way
	Pete Rowley (Contractor)	Water Resources Specialist
	Gretchen Burris	Wilderness Resources Specialist
	Michael Kuyper	Range Specialist
	Kristin May	Soils Specialist
	Alan B. Shepherd	Natural Resource Specialist
	Jeff Brower	Air and Water Quality Specialist
	Karen Prentice	Weeds
	William Smith	Wildlife Biologist

TABLE 5-3
EIS Core Team

Organization	Team Member	Role
Bureau of Land Management	Jeff Weeks	BLM, Ely Field Office, Management Review
	Dan Netcher	BLM Team Lead
	Mike Baughman (Contractor)	BLM EIS Project Manager
Toquop Energy	Pat King	Proponent
	Chris Garrett	Proponent
Nevada Land and Resource Company	Don Pattalock	Proponent
	Dave Buhlig	Realty Specialist—Land Exchange
	Tom Burke	Cultural Resources Specialist
CH2M HILL (Contractor)	Tom Haislip	Contractor EIS Project Manager
Lincoln County	Doug Carriger	Proponent

TABLE 5-4
Other Reviewers

Organization	Team Member	Role
Bureau of Land Management Nevada State Office	Brian Amme	Environmental Protection Specialist/ Planning
	Randy McNatt	Fish/Forestry Specialist
	Erick Campbell	Wildlife Biologist
	Jim Stobaugh	Lands Team Lead
	Dennis Samuelson	Realty Specialist
	Bill Brooks	Hydrologist/SMA Specialist
	Pat Barker	State Archaeologist
	Tom Burke	Assistant State Archaeologist
	Paul Myers	Regional Economist
Bureau of Land Management Carson City Field Office	Rick Brigham	Wildlife Resource Specialist
	Tom Crawford	Economist
	Jim deLaureal	Soils Specialist
	JoAnn Hufnagle	Realty Specialist—Lands
	Carla James	Minerals Specialist
	Dean Kinerson	Plant Specialist
	Terry Knight	Wilderness Specialist
	Terry Knutson	NEPA/Planning Specialist
	Terry Neumann	HAZMAT Specialist
	Pete Raffetto	Range Specialist
	Jim Schroeder	Water Resource Specialist
	Margaret Waski	Cultural Resource Specialist
Bureau of Land Management Las Vegas Field Office	Jackie Gratton	EIS/RMP Coordinator
	Jeff Steinmetz	Environmental Protection Specialist
	Donn Siebert	Natural Resources Specialist
	Gayle Marrs-Smith	Botanist
	Sharon McKelvey	Wildlife Biologist
	Kristen Murphy	Wildlife Biologist
	Robert Bruno	Recreation Specialist
	Stanton Rolf	Archeologist

TABLE 5-5
EIS Consultant Team

Organization	Team Member	Role	Qualifications
CH2M HILL	Tom Haislip	Project Manager	M.S., Ecology, University of Oklahoma; B.S., Zoology, Texas Christian University; 29 years of experience
	Randy Schulze	Toquop Program Manager	M.S., Environmental Engineering Sciences, University of Florida; B.A., Biological Sciences, University of South Florida; 22 years of experience
	Lynn Foster	EIS Coordinator	M.S., Fisheries, University of Wyoming; B.S., Biology, Ohio State University; 36 years of experience
	Phil Williams	Scoping and Alternatives Development	M.S., Biology, Eastern Washington University; B.S., Biology, Washington State University; 29 years of experience
	Mark Cochran	Biological Resources	Graduate studies in Zoology and Wildlife Management at the University of Michigan and Humboldt State University; BA, Biology, Grinnell College; 3 years of experience
	Bob Turner	Biological Resources	M.S., Wildlife Management, University of Nevada, Reno, 1985; B.S., Forest Management and Wildlife, Stephen F. Austin State University, Texas, 1977; A.A., Electronics, U.S. Army Missile & Munitions School, Huntsville, Alabama, 1973; 24 years of experience
	Frank Lewis	Water Resources	M.S., Hydrogeology, University of Arizona; B.A., Physical Geography/Ecosystem Analysis, University of California, Los Angeles; 17 years of experience
	Eden Britt	Water Resources	B.S., Zoology, University Of Florida, 1985; 17 years of experience
	Doug Huxley	Land and Physical Resources	B.S., Chemical and Petroleum Refining Engineering, Colorado School of Mines; 16 years of experience
	Monique Chaisson	EIS Coordinator/Land and Physical Resources	M.I.T., Environmental Compliance Management, College of Engineering & Applied Sciences, Arizona State University; B.A., Ecology and Evolutionary Biology, College of Arts & Sciences, University of Arizona; 14 years of experience
	Denny Mengel	Land and Physical Resources	Ph.D., Soil Sciences, North Carolina State University; M.S. Forestry, University of Idaho, B.S., Wildlife Resources, University of Idaho; 22 years of experience

TABLE 5-5
EIS Consultant Team

Organization	Team Member	Role	Qualifications
	Wendy Haydon	Land and Physical Resources/Socioeconomics	M.S., Recreation Administration, California State University, Sacramento; B.A., Environmental Studies, California State University, Sacramento; 18 years of experience
	Fatuma Yusuf	Socioeconomics	Ph.D., Washington State University; M.S., Washington State University; Master Of Arts, Washington State University; B.S. – University Of Nairobi; 7 years of experience
	John O'Connor	Socioeconomics	Ph.D., Agricultural Economics – Washington State University; M.S., Agricultural and Resource Economics – University of Maine; B.A., Economics – University Of North Carolina-Charlotte; 8 years of experience
	Regan Giese	Cultural Resources	M.A., Anthropology, New Mexico State University; B.L.S., Anthropology, St. Edwards University; 33 years of experience
	Eric Oden	Project Editor	M.A., Education, Boise State University; B.A., Education, Boise State University; 18 years of experience
	Janie Iseri	Lead Document Processor	A.G.S., Treasure Valley Community College; 16 years of experience
GeoMarine	Mark Slaughter	Cultural Resources	M.A., Anthropology, Eastern New Mexico University; B.A., History, Southwest Missouri University; 19 years of experience

Chapter 6
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Chapter 6.0 References

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Acronyms and Abbreviations

Acronyms and Abbreviations

AAACs	Average Acceptable Ambient Air Concentrations
ACEC	Area of Critical Environmental Concern
ADT	average daily traffic
ADTT	average daily truck traffic
afy	acre-feet per year
AIRFA	American Indian Religious Freedom Act
AML	appropriate management level
APA	Approved Caliente Management Framework Plan Amendment
APE	Area of Potential Effect
APN	Assessor Parcel Number
AQRV	Air Quality Related Value
ARPA	Archeological Resources Protection Act
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AUM	animal unit month
BA	Biological Assessment
BEA	Bureau of Economic Analysis
BACT	best available control technology
BIA	U.S. Bureau of Indian Affairs
BLM	Bureau of Land Management
BMPs	best management practices
BO	Biological Opinion
BPI	Building Profile Input Program
BTU	British thermal unit
CAA	Clean Air Act
CARB	California Air Resource Board
CATEF	California Air Toxics Emission Factor
CX	Categorical Exclusion
CEQ	Council on Environmental Quality

CFR	Code of Federal Regulations
CO	carbon monoxide
Cogentrix	Cogentrix Energy, Inc.
CRMP	Consolidate Resource Management Plan
CWA	Clean Water Act
dBA	A-weighted decibels
DEIS	draft environmental impact statement
DOI	U.S. Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Act
FLEFA	Federal Land Exchange Facilitation Act of 1988
FLPMA	Federal Land Policy and Management Act
FWS	U.S. Fish and Wildlife Service
FY	fiscal year
gal/day/ft	gallons per day per foot
GE	General Electric
GIS	geographic information system
gpm	gallons per minute
GPS	global positioning system
ha	hectare
HAP	hazardous air pollutant
HCP	habitat conservation plan
HMA	herd management area
IMP	Interim Management Policy
ISA	Instant Study Area
ITA	Indian Trust assets
kV	kilovolt

lb/hr	pounds per hour
LOP	Letter of Permission
m/s	meters per second
$\mu g/m^3$	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
MFP	management framework plan
MFPA	Management Framework Plan Amendment
mg/L	milligrams per liter
mm	millimeter
MMBTU	million BTU
MMscf/yr	million standard cubic feet per year
MOA	memorandum of agreement
mph	miles per hour
MRL	Minimal Risk Levels
MSA	Metropolitan Statistical Area
MW	megawatt
N_2	elemental nitrogen
NAAQs	National Ambient Air Quality Standards
NAGPRA	National American Graves Protection and Repatriation Act of 1990
NCA	Noise Control Act
NDEP	Nevada Division of Environmental Protection
NDEP BAQ	Nevada Division of Environmental Protection Bureau of Air Quality
NDOW	Nevada Division of Wildlife
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NLRC	Nevada Land and Resource Company LLC
NNHP	Nevada Natural Heritage Program
NOI	Notice of Intent
NO_x	oxides of nitrogen

NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NPV	net present value
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NSPS	New Source Performance Standards
NWI	National Wetlands Inventory
NWP	Nationwide Permit Program
O_2	oxygen
O_3	ozone
OHV	off-highway vehicle
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
PG&E	Pacific Gas & Electric Co.
PM10	particulate matter with mean aerometric diameter smaller then 10 microns
PPA	Pollution Protection Act
ppmv	parts per million by volume
ppmvd	parts per million by volume, dry basis
ppmvw	parts per million by volume, wet basis
PRG	Preliminary Remediation Goals
PSD	Prevention of Significant Deterioration
PTE	potential to emit
REIS	Regional Economic Information System
RFFA	Reasonably Foreseeable Future Actions
RMP	resource management plan
ROD	Record of Decision
ROW	right-of-way
RV	recreational vehicle
SAM	Social Accounting Matrix

SCR	selective catalytic reduction
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Office
SIA	significant impact area
SIL	significant impact level
SMA	special management area
SO_2	sulfur dioxide
SOP	standard operating procedure
SPCCP	Spill Prevention, Control, and Countermeasure Plan
SR	State Route
ST	steam turbine
TCP	traditional cultural property
TDS	total dissolved solids
Toquop Energy	Toquop Energy, Inc.
tpy	tons per year
TUP	Temporary Use Permit
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USGS	United States Geological Survey
VOCs	volatile organic compounds
VRM	Visual Resource Management
WSA	Wilderness Study Area
WSCC	Western Systems Coordinating Council
yr	year

Glossary

Glossary

Access (road)	Road used for passage to project sites and along utility corridors for purposes of construction, operation, and maintenance.
Acre-foot	Volume of water (43,560 cubic feet) that would cover 1 acre, 1 foot deep. Equivalent to 325,851.3 gallons.
Aesthetic quality	A perception of the beauty of a natural or cultural landscape.
Affected environment	Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.
Air quality	Measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.
Air quality classes	Classifications established under the Prevention of Significant Deterioration (PSD) portion of the Clean Air Act that limit the amount of air pollution considered significant within an area. Class I applies to areas where almost any change in air quality would be significant; Class II applies to areas where the deterioration normally accompanying moderate well-controlled growth would be permitted; and Class III applies to areas where industrial deterioration would generally be allowed.
Alternative (action)	An option for meeting the stated purpose and need.
Alternative (route)	An optional path or direction for a road, pipeline, or transmission line.
Alluvial, alluvium	Relating to material deposited by running water, such as clay, silt, sand, and gravel. Sedimentary material transported and deposited by the action of flowing water.
Alluvial fan	Cone-shaped deposits of alluvium made by a stream. Fans generally form where streams emerge from mountains onto the lowland.
Ambient	The surrounding natural conditions (or environment) in a given place and time.

Animal Unit Month (AUM)	The amount of forage necessary for the sustenance of one cow or its equivalent (one cow, bull, steer, heifer, horse, burro, mule, five sheep, or five goats over the age of 6 months at the time of entering the public lands or other lands administered by BLM) for a period of 1 month.
Aquatic	Growing or living in or near the water.
Aquifer	A stratum or body of permeable rock, sand, etc. that contains water. Water source for a well.
Archaeology	The scientific study of the life and culture of ancient peoples, as by excavation of ancient cities, relics, or artifacts.
Area of Critical Environmental Concern	A BLM designation for an area within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources, or other natural systems or processes; or to protect life from natural hazards.
Artifact	Any object showing human workmanship or modification, especially from a prehistoric or historic culture.
Assessment (environment)	An evaluation of existing resources and potential impacts on them from a proposed act or change to the environment.
Avifauna	Birds of a specified region or time.
Cambrian	The earliest geologic period in the Paleozoic Era, spanning the time of 570 to 500 million years ago, and marked by a profusion of marine animals.
Candidate species	A plant or animal species not yet officially listed as threatened or endangered, but which is undergoing status review by the USFWS.
Capability	The ability to generate or transmit power.
Capacity	The maximum load that can be generated or transmitted by generating or transmission facilities for a given period of time without exceeding approved limits of temperature or stress.
Clean Water Act	Provides for pollution control activities and funding at the federal level including grant programs, research and related programs, as well as provisions for setting standards and enforcement actions.

Council on Environmental Quality	An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their effort on the environment studies, and advises the President on environmental matters.
Cubic feet per second	Unit of discharge, or volume rate of flow, equal to 0.0283 cubic meters per second. As a rate of streamflow, a cubic foot of water passing a referenced section in 1 second. A measure of a moving volume of water (1 cfs = 0.0283 m^3/s).
Cultural resources	A broad, general term meaning any cultural property reflecting past human activity or use that has a definite location, and any traditional lifeway value important to a contemporary social and/or cultural group's traditional systems of religious belief, cultural practices, or social interaction.
Cumulative impact	The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions—regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508.7).
Demand	The energy requirement (load) placed upon a utility's generation at any specific point in time. A utility's demand (energy needed) increases and decreases instantaneously as consumers turn their electrical appliances on or off. Demand is increased or decreased in such terms as watts, kilowatts, and megawatts.
Draft Environmental Impact Statement	A detailed written statement as required by Section 102(2)(c) of NEPA.
Effect (also see Impact)	
Direct effect	Caused by the action and occurs at the same time and place (40 CFR 1508.8(a)).
Indirect effect	Caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include: growth inducing effect and other effects related to induced changes in the pattern of land use; population density or growth rate; and related effects on air and water and other natural systems, including ecosystems.
Electric and magnetic field	A space or region within which magnetic forces are present around an electrical current.

Emergent (vegetation)	Vegetation with all or part of their vegetative and reproductive parts above the water.
Endangered species	Any species in danger of extinction throughout all or a significant portion of its range.
Endemic	Plants or animals that are native to a particular region or country.
Environment	The surrounding conditions, influences or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.
Environmental Impact Statement	A formal public document prepared to analyze the impacts on the environment of the proposed project or action and released for comment and review. An EIS must meet the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the proposed project or action.
Environmental Impact Statement, Final	The final version of the public document required by NEPA.
Ephemeral	Present only during a portion of the year. Generally refers to water courses.
Evapotranspiration	The combined loss of water from a given area and during a specific period of time by evaporation from the soil surface and by transpiration from plants.
Fault	A fracture or fracture zone in the earth's surface along which there has been displacement of the sides relative to one another.
Fauna	The wildlife or animals of a specified region or time.
Federal Energy Regulatory Commission	Agency primarily responsible for ensuring adequate energy supplies at just and reasonable rates and providing regulatory incentives for increased productivity, efficiency, and competition.

Federal Land Policy and Management Act of 1976	Public Law 94-579 signed by the President on October 21, 1976. Established public land policy for management lands administered by the Bureau of Land Management (BLM). FLPMA specifies several key directions for the BLM, notably: 1) management on the basis of multiple use and sustained yield; 2) land use plans prepared to guide management actions; 3) public lands for the protection, development, and enhancement of resources; 4) public lands retained in federal ownership; and 5) public participation used in reaching management decisions.
Floodplain	That flat portion of a river or stream valley adjacent to the river channel that is built of sediments and is inundated with water when the stream overflows its banks.
Fossil	The remains or traces of an organism or assemblage of organisms that have been preserved by natural processes in the earth's crust.
Generation	Process of producing electrical energy by transforming other forms of energy; also, amount of electric energy produced, expressed in kilowatt hours.
Geologic formation	A rock unit distinguished from adjacent deposits by some common physical characteristic, such as its composition, origin, color, or age.
Geology	The science that studies the earth. The materials, processes, environments, and history of the planet, especially the lithosphere, including the rocks and their formation and structure.
Habitat	The region where a plant or animal naturally grows or lives. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and home range.
Hydrology	The science that studies the properties, distribution, and circulation of natural surface water and ground water.
Impact	A modification in the status of the environment brought about by a proposed action.

Infrastructure	The basic installations and facilities on which the continuance and growth of a community depend (for example, roads, schools, sewers, power plants, transportation, and communication systems).
Isolate/Isolated Artifact	A single artifact, feature, or object not associated with other cultural resources. An isolate is not normally considered a property.
Kilovolt	1,000 volts (a volt is a measure of electrical potential difference that would cause a current of 1 ampere to flow through a conductor whose resistance is 1 ohm).
Kilowatt	A unit of power equivalent to 1,000 watts.
Landform	A term used to describe the many types of land surfaces that exist as a result of geologic activity and weathering (for example, plateaus, mountains, plains, and valleys).
Lithic	Pertaining to stone or a stone tool (for example, lithic artifact).
Lithology	The appearance, structure, and composition of rocks as determined by study with the unaided eye or with little magnification.
Megawatt	1,000 kilowatts or 1 million watts (a watt is a unit of electrical power equal to 1/756th horsepower).
Mesa	An isolated, nearly level land mass, formed of nearly horizontal rocks, standing above the surrounding country and bounded with steep sides.
Migratory	Birds, animals, or people, that migrate or move from one region or country to another.
Milligauss	A unit of measurement for magnetic fields.
Mineral resource	Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.
Mississippian	A period of the Paleozoic Era, spanning in time from about 345 to 320 million years ago.
Mitigate	To alleviate, reduce, or render less intense or severe.

Mitigation	Action taken to avoid, reduce the severity of, or eliminate an adverse impact.
National Ambient Air Quality Standards	Air quality standards established by the Clean Air Act. The primary NAAQS are intended to protect the public health with an adequate margin of safety; the secondary NAAQS are intended to protect the public welfare from any known or anticipated adverse effects of a pollutant.
National Environmental Policy Act of 1969	Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.
National Register of Historic Places	A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance, established by the Historic Preservation Act of 1966 and maintained by the National Park Service.
Native vegetation	Vegetation originating in a certain region or country.
Nonattainment area	An air quality control region (or portion thereof) in which the U.S. Environmental Protection Agency has determined that ambient air concentrations exceed national ambient air quality standards for one or more criteria pollutants.
100-year flood	A flood with a magnitude that may occur once every 100 years on average. An area has a 1-in-100 chance of being inundated during any single year.
Ozone	A form of oxygen, O_3, produced especially when an electric spark is passed through oxygen or air.
Paleontology	The science that deals with the life of past geological ages through the study of the fossil remains of organisms.
Paleozoic	The geologic era between the Precambrian and Mesozoic eras covering the time between 550 million and 225 million years ago. The era was characterized by the development of the first fishes, amphibians, reptiles, and land plants.
Particulates	Minute, separate particles, such as dust or other air pollutants.
Pennsylvanian	A period of the Paleozoic Era, spanning from about 320 million to 280 million years ago.
Perennial	Lasting, or active through the whole year. May refer to rivers, streams, or plants.

Permeability	The measure of the ease with which a fluid can diffuse through a particular porous materials.
Permian	The seventh and last period of the Paleozoic Era, spanning from about 280 to 225 million years ago, characterized by increased reptile life and major mountain building in North America.
Petroglyph	A symbolic design or drawing or an animal or human pecked or carved into a rock or cliff face—generally prehistoric.
Physiographic Province	A large area characterized by distinctive topography, geologic structure, and other features and phenomena of nature.
Plateau	An elevated tract of relatively level land, such as a tableland or large mesa.
Playa	The shallow central lake basin of a desert plain, in which water gathers after a rain and is evaporated.
Pleistocene	The first geologic epoch during the Quaternary period, spanning from 1.8 million years ago to approximately 10,000 years ago, characterized by extensive continental glaciation in the Northern Hemisphere.
Policy	A guiding principle upon which is based a specific decision or set of decisions.
Power	Measure of the amount of energy (work) being used at a specific point in time. Power is measured in such terms as watts, kilowatts, and megawatts. Power implies capacity in addition to energy.
Precambrian	The earliest geologic era covering all time from the formation of the earth and ending at the Paleozoic Era, which began about 520 million years ago.
Primitive	An area that is not developed, a pristine natural area.
Quaternary	The geologic period following the Tertiary in the Cenozoic Era, beginning about 1.8 million years ago, composed of the Pleistocene and Holocene epochs, characterized by the evolution of Hominids into modern humans.
Range	A large, open area of land over which livestock can wander and graze.
Raptor	A bird of prey.

Rare	A plant or animal restricted in distribution. May be locally abundant in a limited area or few in number over a wide area.
Reclamation	Returning disturbed lands to a form and productivity that will be ecologically balanced.
Region	A large trace of land generally recognized as having similar character types and physiographic types.
Revegetation	The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as reseeding.
Right-of-way	Strip of land acquired by legal means, over which the utility corridors and access roads would pass.
Sacred site	Any specific, discrete, narrowly delineated location on Federal land identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative has informed the agency of the existence of such a site.
Scenic quality class	The designation (A, B, or C) assigned a scenic quality rating unit to indicate the visual importance or quality of a unit relative to other units within the same physiographic province (BLM designation).
Scenic quality rating unit	A portion of the landscape that displays primarily homogeneous visual characteristics of the basic landscape features (landform, water, vegetation, and structures and modifications) that separate it from the surrounding landscape.
Sediment	Solid fragmental material, either mineral or organic, that is transported or deposited by air, water, gravity, or ice.
Seismicity	The relative frequency and distribution of earthquakes.
Semiarid	A climate or region characterized by little yearly rainfall and by the growth of a number of short grasses and shrubs.
Sensitive species	Species whose populations are small and widely dispersed or restricted to a few localities. Species that are listed or candidates for listing by the state or federal government.

Sensitivity	The state of being readily affected by the actions of external influence.
Site	In archaeology, any locale showing evidence of human activity.
Socioeconomic	Of or involving both social and economic factors.
Species	A group of individuals of common ancestry that closely resemble each other structurally and physiologically, and in nature interbreed to produce fertile offspring.
Spring	A place where ground water flows naturally onto the land surface; often the source of a stream.
Strata	Plural of stratum, which is a layer of sedimentary rock that was originally deposited horizontally.
Study area	A given geographical area delineated for specific research.
Subspecies	Any natural subdivision of a species that exhibits small, but persistent morphological variations from other subdivisions of the same species living in different geographical regions or times.
Substrate	Sediment that lies beneath the surface of the earth.
Take	A prohibited action under federal law, except where authorized. To harass, harm, pursue, hunt, wound, kill, trap, capture, or collect a federally listed threatened or endangered species, or to attempt to do so. Take may include disturbance of the listed species, nest, or habitat, when disturbance is extensive enough to disrupt normal behavioral patterns for the species, although the affected individuals may not actually die.
Talus	A pile of rock debris at the foot of a cliff or steep slope.
Tertiary	The first period in the Cenozoic Era, spanning from 65 to 1.8 million years ago characterized by the development of mammals.
Threatened species	Any species likely to become endangered within the foreseeable future throughout all or a significant part of its range.
Topography	The relative positions and elevations of surface features of an area.

Traditional cultural property	A term referring to a tangible site, district, structure, building, or object with defensible boundaries that is important to a contemporary human community and has been for 50 years or more, that has significance under one or more criteria of the National Register of Historic Places, and with integrity of location, design, setting, materials, workmanship, feeling, and association in the perspective of those who value the place.
Triassic	The first period in the Mesozoic Era, spanning from 225 to 190 million years ago and following the Permian Period of the Paleozoic Era; characterized by the first appearance of many reptiles, including the dinosaurs.
Tributary	A stream or river that flows into a larger stream or river.
Utility corridor	A route used by a utility for pipelines and transmission lines.
Vegetation community	Species of plants that commonly live together in the same region or ecotone.
View shed	Visible portion of the specific landscape seen from a specific viewpoint, normally limited by landform, vegetation, distance, and existing cultural modifications.
Visual resource management class	Classification of landscapes according to the kinds of structures and changes that are acceptable to meet established visual goals (BLM).
Waters of the United States	All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce including adjacent wetlands and tributaries to waters of the United States; and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.
Wetlands	Lands or areas exhibiting hydric soils, saturated or inundated soil during some portion of the plant growing season, and plant species tolerant of such conditions (includes swamps, marshes, bogs).
Wind rose	A diagram which depicts the frequency and intensity of winds from various directions for a particular location.

Index

Index

ACEC: ES-11, ES-12, 2-26, 2-27, 2-39, 2-52, 3-43, 3-74, 3-87, 3-88, 3-95, 4-21, 4-23, 4-62, 4-65, 4-66, 4-114, 4-115, 4-119, 4-121, 4-123, 5-2

air-cooled: ES-14, ES-15, 2-2, 2-10, 2-41, 2-42, 2-48, 3-3, 4-53, 4-55, 4-56, 4-60, 4-83, 4-93, 4-94, 4-112, 4-114, 4-121, 5-23, 5-211

Alternative 1: ES-6, ES-12, 2-1, 2-2, 2-33, 2-34, 2-35, 2-39, 2-49, 3-1, 3-2, 3-44, 3-63, 3-74, 3-87, 3-97, 3-101, 4-2, 4-3, 4-4, 4-7, 4-19, 4-20, 4-22, 4-23, 4-24, 4-25, 4-26, 4-28, 4-29, 4-37, 4-38, 4-43, 4-44, 4-50, 4-52, 4-55, 4-58, 4-61, 4-63, 4-65, 4-66, 4-68, 4-69, 4-70, 4-80, 4-84, 4-88, 4-90, 4-95, 4-99, 4-106, 4-109, 4-110, 4-113, 4-116, 4-118, 4-120, 4-121, 4-122, 4-124

Alternative 2: ES-6, ES-12, 2-1, 2-2, 2-3, 2-35, 2-36, 2-39, 2-40, 2-49, 2-50, 3-1, 3-2, 3-10, 3-18, 3-44, 3-63, 3-74, 3-87, 3-88, 3-97, 3-101, 4-2, 4-3, 4-4, 4-7, 4-19, 4-20, 4-22, 4-23, 4-24, 4-26, 4-27, 4-29, 4-37, 4-38, 4-43, 4-44, 4-50, 4-52, 4-53, 4-55, 4-58, 4-59, 4-61, 4-63, 4-66, 4-67, 4-69, 4-70, 4-80, 4-81, 4-82, 4-84, 4-88, 4-89, 4-99, 4-100, 4-101, 4-106, 4-109, 4-110, 4-111, 4-112, 4-113, 4-114, 4-117, 4-118, 4-119, 4-120, 4-121, 4-122, 4-124

critical habitat: 1-10, 2-27, 2-34, 2-39, 2-50, 3-44, 3-52, 3-55, 3-73, 4-21, 4-23, 4-99

cultural resources: ES-12, ES-13, ES-14, 3-97, 3-99, 3-100, 4-67, 4-68, 4-69, 4-115, 4-121, 4-126, 5-24, 5-25, 5-26

desert tortoise: ES-12, 2-24, 2-26, 2-32, 2-34, 2-35, 2-39, 2-40, 2-49, 2-50, 2-52, 3-43, 3-44, 3-54, 3-58, 3-87, 3-88, 4-21, 4-22, 4-23, 4-24, 4-25, 4-26, 4-65, 4-89, 4-98, 4-99, 4-100, 4-101, 4-118, 4-119, 4-120, 4-125

grazing: 1-10, 3-42, 3-44, 3-73, 3-74, 3-83, 3-88, 4-25, 4-62, 4-63, 4-64, 4-119

ground water: ES-12, ES-13, ES-14, 2-10, 2-16, 2-17, 2-25, 2-27, 2-31, 2-34, 2-36, 2-42, 2-51, 3-3, 3-4, 3-17, 3-18, 3-21, 3-22, 3-26, 3-27, 3-28, 3-29, 3-30, 3-31, 3-32, 3-33, 3-34, 3-35, 3-36, 3-39, 3-40, 3-41, 3-42, 3-43, 4-2, 4-7, 4-8, 4-9, 4-10, 4-11, 4-12, 4-13, 4-14, 4-15, 4-16, 4-17, 4-18, 4-19, 4-20, 4-24, 4-26, 4-27, 4-89, 4-92, 4-93, 4-97, 4-118, 4-120, 4-121, 4-124, 4-125, 5-22, 5-23

land exchange: ES-2, ES-6, ES-11, ES-13, ES-14, ES-15, 1-2, 1-8, 1-9, 1-10, 1-13, 2-1, 2-2, 2-10, 2-11, 2-15, 2-16, 2-17, 2-53, 3-1, 3-72, 3-98, 3-99, 4-3, 4-4, 4-6, 4-7, 4-17, 4-18, 4-19, 4-25, 4-52, 4-58, 4-61, 4-63, 4-67, 4-68, 4-69, 4-74, 4-79, 4-80, 4-85, 4-115, 4-116, 4-117, 4-118, 4-121, 5-21, 5-22, 5-23, 5-24, 5-25, 5-26, 5-29, 5-211

Proposed Action: ES-1, ES-6, ES-12, ES-14, 1-1,1- 2,1- 8, 1-9, 1-10, 1-11, 1-12, 1-13, 2-1, 2-2, 2-3, 2-10, 2-11, 2-15, 2-16, 2-25, 2-26, 2-27, 2-28, 2-30, 2-31, 2-32, 2-33, 2-34, 2-35, 2-36, 2-39, 2-40, 2-41, 2-42, 2-48, 2-49, 2-50, 3-1, 3-2, 3-3, 3-5, 3-10, 3-11, 3-12, 3-21, 3-22, 3-26, 3-44, 3-61, 3-62, 3-63, 3-64, 3-72, 3-74, 3-83, 3-87, 3-88, 3-95, 3-97, 3-98, 3-99, 3-101, 3-103, 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, 4-9, 4-12, 4-14, 4-18, 4-19, 4-20, 4-21, 4-22, 4-23, 4-24, 4-25, 4-26, 4-27, 4-28, 4-29, 4-30, 4-37, 4-38, 4-40, 4-41, 4-42, 4-43, 4-44, 4-45, 4-46, 4-47, 4-48, 4-50, 4-51, 4-52, 4-53, 4-54, 4-55, 4-56, 4-57, 4-58, 4-59, 4-60, 4-61, 4-62, 4-63, 4-64, 4-65, 4-66, 4-67, 4-68, 4-69, 4-70, 4-71, 4-72, 4-73, 4-74, 4-75, 4-76, 4-77, 4-78, 4-79, 4-80, 4-81, 4-82, 4-83, 4-84, 4-85, 4-86, 4-87, 4-88, 4-89, 4-90, 4-95, 4-97, 4-98, 4-99, 4-100, 4-101, 4-102, 4-105, 4-106, 4-109, 4-110, 4-111, 4-112, 4-113, 4-114, 4-115, 4-116, 4-117, 4-118, 4-120, 4-121, 4-122, 4-124

right-of-way: 1-13, 2-16, 2-25, 2-26, 2-27, 2-29, 2-31, 2-34, 2-39, 2-48, 2-52, 3-44, 4-25, 4-26, 4-65, 4-69, 4-87, 4-88, 4-99, 4-101

ROWs: ES-1, ES-6, ES-12, 1-1, 1-8, 2-1, 2-2, 2-10, 2-16, 2-17, 2-26, 2-30, 2-32, 2-33, 2-35, 2-40, 2-41, 2-49, 3-1, 3-97, , 4-2, 4-63, 4-64, 4-84

special status species: 4-23, 4-122

spring: 3-16, 3-29, 3-35, 3-39, 3-44, 3-54, 3-58, 3-59, 3-62, 3-71, 3-74, 3-83, 4-17, 4-20, 4-37, 4-61

Virgin River: 1-8, 2-11, 2-12, 3-5, 3-10, 3-12, 3-13, 3-16, 3-17, 3-18, 3-21, 3-22, 3-26, 3-27, 3-29, 3-32, 3-39, 3-40, 3-41, 3-42, 3-43, 3-45, 3-52, 3-54, 3-61, 3-74, 3-82, 3-96, 3-97, 4-2, 4-6, 4-8, 4-10, 4-12, 4-14, 4-15, 4-16, 4-17, 4-18, 4-19, 4-20, 4-22, 4-27, 4-90, 4-115, 4-125

water-cooled: ES-1, ES-11, ES-15, 1-1, 2-2, 2-10, 2-16, 2-17, 2-18, 2-41, 2-42, 2-53, 4-41, 4-55, 4-92, 4-93, 4-112, 5-211

Wilderness Study Area: 3-69, 3-83, 3-89, 4-64, 4-96, 4-114, 4-119, 4-123

Appendix A

Measures for Protecting Desert Tortoises and Their Habitat

APPENDIX A

Measures for Protecting Desert Tortoises and Their Habitat

The following protective measures will be implemented during project construction, operation, and maintenance to prevent impacts and the potential for impacts to desert tortoises and their habitat. These measures are an integral part of the Proposed Action and Alternatives 1 and 2.

1. A qualified desert tortoise biologist must be present from March 1 through October 30 (active season) in areas that have not been enclosed with tortoise proof fence during surface-disturbing activities to ensure that desert tortoises are not inadvertently harmed, unless the U.S. Bureau of Land Management (BLM) and the U.S. Fish and Wildlife Service (FWS) have determined that the presence of a biologist is unnecessary. The biologist shall be on-call from October 16 through March 14 (inactive season) and must check construction areas immediately before construction activities begin at all times. In addition, a qualified desert tortoise biologist will be on site during any construction within critical habitat.

2. If fence construction occurs during the tortoise active season, a qualified tortoise biologist shall be onsite during construction of the tortoise-proof fence to ensure that no tortoises are harmed. During the active season temporary or permanent tortoise-proof fencing will be required to be installed for all areas of surface disturbing activities prior to the onset of construction activities. If the fence is constructed during the tortoise inactive season, a biologist will thoroughly examine the proposed fence line and burrows for the presence of tortoises no more than 3 days before construction commences.

3. Any desert tortoises or eggs found in the fence line will be relocated offsite by a qualified tortoise biologist in accordance with approved protocol (Desert Tortoise Council 1994, revised 1999). Tortoise burrows that occur immediately outside of the fence alignment that can be avoided by fence construction activities shall be clearly marked to prevent crushing.

4. Permanent fencing to exclude tortoise will be required on the access road from Interstate 15 to the proposed plant site. In addition, a tortoise fence will be constructed around the power plant site. In accordance with current specifications, fencing shall consist of 1-inch-horizontal by 2-inch-vertical mesh. The mesh shall extend at least 18 inches above ground and, where feasible, 6 to 12 inches below ground. In situations where it is not feasible to bury the fence, the lower 6 to 12 inches of the fence shall be bent at a 90-degree angle towards potentially approaching tortoises and covered with cobble or other suitable material to ensure that tortoises or other animals cannot dig underneath and create gaps that allow passage. Along the access road tortoise undercrossings will be provided at intervals of not greater than 1 mile. It is anticipated that only 2 or 3 undercrossings specifically placed for tortoises will be needed to meet this objective since most of the access road is in terrain that will require frequent culverts for drainage purposes that can also be designed to function as tortoise crossings.

5. The fence shall be inspected on a quarterly basis. Any repairs shall be completed within 72 hours from March 15 through October 15, and within 7 days from October 16 through March 14. The operator shall inspect the fencing at least on a quarterly basis and after major precipitation events to ensure zero ground clearance. Monitoring and maintenance shall include regular removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried. The operator shall perform maintenance when needed, including removing trash, sediment accumulation, and other debris. Fencing may be removed upon termination and reclamation of the project, or when it is determined by the BLM and FWS that the fence is no longer necessary.

6. During surface-disturbing activities, tortoise burrows shall be avoided whenever possible. If a tortoise is found onsite during project activities that may result in take of the tortoise (harm, displace, harass, wound, trap, capture, or kill), such activities shall cease until the tortoise moves or is moved. The tortoise shall be moved by a qualified tortoise biologist. All workers shall also be instructed to check underneath all vehicles before moving such vehicles, and also within stockpiled materials. Tortoises often take cover under vehicles and construct burrows in stockpiled material.

7. Construction sites, staging areas, and access routes shall be cleared by a qualified tortoise biologist before the start of construction. The project area shall be surveyed for desert tortoise using survey techniques that provide 100 percent coverage. From March 15 through October 15, the preconstruction clearance shall take place no more than 3 days prior to initiation of construction; from October 16 through March 14, the preconstruction clearance shall take place no more than 10 days prior to initiation of construction. All desert tortoise burrows, and other species' burrows that may be used by tortoises, will be examined to determine whether the burrow is occupied by desert tortoises. Tortoise burrows shall be cleared of tortoises and eggs, and collapsed. Any desert tortoises or eggs found in the fenced area will be removed under the supervision of a qualified tortoise biologist in accordance with FWS protocol (Desert Tortoise Council 1994, revised 1999).

8. The BLM must approve the selected consulting firm/biologist to be used by the applicant to implement the terms and conditions of rights-of-way (ROWs) issued by the BLM. Any biologist and/or firm not previously approved must submit a curriculum vitae and be approved by the BLM before being authorized to represent the BLM in meeting compliance with the terms and conditions of the ROWs. The BLM will have the option of selecting an independent third-party contractor to act as an agent of the BLM Compliance Inspector Contractor. Other personnel may assist with implementing terms and conditions that involve tortoise handling, monitoring, or surveys, only under direct field supervision by the approved qualified biologist.

9. Tortoises and nests shall be handled and relocated by a qualified tortoise biologist in accordance with FWS-approved protocol (Desert Tortoise Council 1994, revised 1999). Burrows containing tortoises or nests shall be excavated by hand, with hand tools, to allow removal of the tortoise or eggs. Desert tortoises moved during the tortoise inactive season or those in hibernation, regardless of date, must be placed into an adequate burrow; if one is not available, one shall be constructed in accordance with Desert

Tortoise Council (1994, revised 1999) criteria. During mild temperature periods in the spring and early fall, tortoises removed from the site shall not necessarily be placed in a burrow. Tortoises and burrows shall only be relocated to federally managed lands. If the responsible federal agency is not the BLM, verbal permission, followed by written concurrence, shall be obtained from BLM and FWS before relocating the tortoise or eggs to lands not managed by the BLM.

10. Tortoises that are moved offsite and released into undisturbed habitat on public land must be placed in the shade of a shrub, in a natural unoccupied burrow similar to the hibernaculum in which it was found, or in an artificially constructed burrow in accordance with an FWS-approved protocol (Desert Tortoise Council 1994, revised 1999).

11. After a project has been fenced and a tortoise clearance completed, if a desert tortoise is encountered in imminent danger, it shall be moved out of harm's way and onto adjacent BLM land by personnel that have completed the training required in Terms and Conditions 8.h of the Desert Tortoise Council (1994, revised 1999) criteria.. If the tortoise cannot be avoided or moved out of harm's way onto BLM land, it shall be placed in a cardboard box or other suitable container and held in a shaded area until BLM personnel can retrieve the tortoise.

12. If possible, overnight parking and storage of equipment and materials, including stockpiling, shall be in previously disturbed areas or areas to be disturbed that have been cleared by a tortoise biologist. If not possible, areas for overnight parking and storage of equipment shall be designated by the tortoise biologist.

13. All vehicular traffic shall be restricted to existing access roads, or those roads approved by the BLM in consultation with the FWS.

14. Project activity areas shall be clearly marked or flagged at the outer boundaries before the onset of construction. All activities shall be confined to designated areas. Blading of vegetation shall occur only to the extent necessary and shall be limited to areas designated for that purpose by the BLM or tortoise biologist.

15. Prior to issuance of any federal permit, lease, or authorization for any surface-disturbing activity, the project proponent shall pay a remuneration fee for each acre of surface disturbance. The amount and disposition of said fee shall be determined in consultation with the BLM and FWS.

    This fee will be paid directly to the Desert Tortoise Public Lands Conservation Fund Number 730-9999-2315, administered by Clark County or any other administrator approved by both the FWS and BLM. The administrator serves as the banker of these funds and receives no benefit from administering these funds. These funds are independent of any other fees collected by Clark County for desert tortoise conservation planning.

The payment shall be accompanied by the *Section 7 Fee Payment Form* and completed by payee. The project proponent or applicant may receive credit for payment of such fees and deduct such costs from desert tortoise impact fees charged by local government entities. Payment shall be by certified check or money order payable to Clark County (or other administrator named by the BLM and FWS), and delivered to the following:

Clark County
Department of Comprehensive Planning
500 South Grand Central Parkway, Third Floor
Las Vegas, NV 89155-1712
Attn: Desert Plan Administrator

In addition, a copy of the form will be accompanied by a payment verification and delivered to the following:

The Bureau of Land Management
Ely Field Office
HC 33 Box 33500
Ely, NV 89301-9408
Attn: Field Manager

16. Projects resulting in residual impacts shall require the submission of a BLM- and FWS-approved reclamation plan, unless determined by the BLM and FWS that reclamation rehabilitation is not necessary. The reclamation/rehabilitation plan will describe objectives and methods to be used, species of plants and/or seed mixture to be used, time of planting, success standards, and follow-up monitoring. Depending upon the size and location of the project, reclamation could simply involve recontouring; rehabilitation and restriction of access points; or intensive reclamation over the entire area of surface disturbance. The plan shall be prepared within 60 days following completion of the surface disturbance phase of the project. Reclamation shall be addressed on a case-by-case basis.

17. Upon receipt of an application or expression of interest in the expansion of a materials site right-of-way within desert tortoise ACECs, the BLM shall notify the FWS and initiate a 60-day evaluation period. During the evaluation period, the BLM and FWS will consider options to minimize impacts to desert tortoise habitat, such as relocation of areas outside ACECs, other potential sources, and other measures.

18. If a substantial level of disturbance occurs within a desert tortoise ACEC (for example, expansion of materials sites within ACECs), the proponent will rehabilitate an equivalent number of acres with an ACEC in the same recovery unit, within 6 months, or relinquish a similar area back to the BLM. These actions will occur in addition to payment of remuneration fees and other minimization measures in this biological opinion.

19. A litter-control program shall be implemented to minimize predation on tortoises by ravens drawn to the project site. This program shall include the use of covered, raven-proof trash receptacles, removal of trash from project areas to the trash receptacles

following the close of each work day, and proper disposal of trash in a designated solid waste disposal facility. Appropriate precautions must be taken to prevent litter from blowing out along the road when trash is removed from the site. A litter-control program shall be implemented by the responsible federal agency or their contractor, to minimize predation on tortoises by ravens and other predators drawn to the project.

20. A tortoise-education program shall be presented to all personnel working on the project or activities associated with the project. This program shall be presented by a qualified tortoise biologist. The program shall include information on the life history of the desert tortoise, legal protection for desert tortoises, penalties for violations of federal and state laws, general tortoise-activity patterns, reporting requirements, measures to protect tortoises, terms and conditions of the BLM-issued ROWs, and personal measures that employees can employ to promote the conservation of desert tortoises. The definition of "take" will also be explained. Specific and detailed instructions will be provided on the proper techniques to capture and move tortoises that appear onsite, in accordance with USFWS-approved protocol. Currently, the FWS-approved protocol is Desert Tortoise Council (1994, revised 1999).

21. The project applicant shall notify the BLM's authorized project officer at least 10 days before initiation of any project. Notification shall be made to the BLM staff in Caliente at (775) 726-8100, or Ely at (775) 289-1800.

22. The BLM (775/726-8100- Caliente, or 775/289-1800- Ely), and the FWS's Southern Nevada Field Office (702/647-5230) must be notified of any desert tortoise death or injury resulting from project implementation by close of business on the following work day. In addition, the FWS's Division of Law Enforcement shall be notified in accordance with reporting requirements.

23. All appropriate Nevada Division of Wildlife (NDOW) permits or letters of authorization shall be acquired prior to handling desert tortoises and their parts, and prior to initiation of any activity that may require handling tortoises.

24. The project proponent must submit a document to the BLM within 30 days of completion of the project, showing the number of acres disturbed; remuneration fees paid; and number of tortoises taken, which includes capture and displacement, killed, injured, and harassed by other means, during project activities covered under the biological opinion.

25. All projects to be covered under the Biological Opinion shall be reviewed by the BLM's wildlife staff to ensure that appropriate measures have been incorporated into the BLM authorization (for example, material site, land sale, or OHV event) to minimize the potential take of desert tortoise and loss of habitat.

26. The BLM will keep an up-to-date log of all actions taken under consultation; number of acres affected; results of tortoise survey and removal activities (including reported number of desert tortoises injured, killed, or removed from project site); date, rate (per acre adjusted for inflation) and amount of fees paid for each project; and progress of recovery actions. The BLM will provide information to the FWS's Southern Nevada

Field Office annually. Annual reports will be due on February 1, for the previous calendar year in which actions were covered under the biological opinion. Information will be cumulative throughout the life of the consultation. Annual reports shall include maps showing the location of actions within ACEC's authorized under the opinion and other information required in the biological opinion.

27. For those actions identified in this biological opinion that require concurrence between the BLM and the FWS, written notification of proposed changes or actions will be made a minimum of 30 days in advance. Both agencies will coordinate to the maximum extent practicable to achieve resolution. This may include informal meetings to discuss proposed actions and reach concurrence, or written correspondence.

28. In accordance with *Procedures for Endangered Species Act Compliance for the Mojave Desert Tortoise*, a qualified desert tortoise biologist should possess a bachelor's degree in biology, ecology, wildlife biology, herpetology, or closely related fields as determined by the BLM. The biologist must have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises and tortoise sign, which should include a minimum of 60 days of field experience. All tortoise biologists shall comply with the FWS-approved handling protocol prior to conducting tasks in association with terms and conditions of the biological opinion. In addition, the biologist shall have the ability to recognize tortoise sign and accurately record survey results.

29. A BLM respresentative(s) will be designated to be responsible for overseeing compliance with the reasonable an prudent measures, terms, and conditions, reporting requirements, and re-initiation requirements jointly agreed to by BLM and FWS. The designated representative shall provide coordination among the permittee, project proponent, the BLM, and the FWS.

30. In the event blasting is required, prior to blasting a 200-foot area around the blasting site will be surveyed for desert tortoises using 100-percent coverage survey techniques. All tortoises found above ground or in pallets within this 200-foot radius of the blasting site will be moved 500 feet from the blasting site. Additionally, tortoises in burrows within 75 feet of the blasting will be placed into an artificial or unoccupied burrow 500 feet from the blasting site. This will prevent tortoises that leave their burrow upon translocation from returning to the blasting site. Tortoises in burrows at a distance of 75 to 200 feet from the blasting site will be left in their burrows. Burrow locations will be flagged and recorded using a GPS unit and burrows will be stuffed with newspapers. Immediately after blasting, newspaper and flagging will be removed.

Appendix B
Standard Construction and Operation Procedures

APPENDIX B

Standard Construction and Operation Procedures

This appendix describes a number of standard procedures intended to reduce the potential for short- and long-term impacts. These procedures will be implemented during construction and operation of all features of the Toquop Energy Project. Each of these procedures will be incorporated into all construction specifications and contract documents, as appropriate, and all contractors will be required to follow them. These procedures are an integral part of the Proposed Action and Alternatives 1, 2, and 3.

Landscape Preservation and Impact Avoidance

1. To the maximum extent practicable, all trees, native shrubs, and other vegetation will be preserved and protected during construction operations and equipment except where clearing operations are required for permanent structures, approved construction roads, and excavation operations.

2. To the maximum extent practicable, all maintenance yards, field offices, and staging areas will be arranged to preserve trees, shrubs, and other native vegetation.

3. Clearing will be restricted to that area needed for construction.

4. All areas around structures will be backfilled, compacted, and returned as close as possible to the original condition and grade.

5. In order to reduce environmental damage, washes, steep slopes, or sensitive environmental areas will not be used for equipment or materials storage or stockpiling; construction staging or maintenance; field offices; hazardous material or fuel storage, handling, or transfer; or temporary access roads.

6. Excavated or graded materials will not be stockpiled or deposited on or within 100 feet of any steep slopes (defined by industry standards) or washes (including seasonally active ephemeral drainages.

7. The width of all new permanent access roads will be kept to the absolute minimum needed for operation, avoiding sensitive areas and trees where possible, and limiting disturbance to vegetation.

8. When and where applicable, landscaping standards, including clearing of native vegetation, will be followed as prescribed by local land use and management agencies when work is within their jurisdictions.

Erosion and Sediment Control

1. Planting native grasses, forbs, trees, or shrubs beneficial to wildlife, or placing riprap and other materials as appropriate, will be used to prevent and minimize the potential for

erosion and siltation during construction of project features and during the period needed to reestablish permanent vegetative cover on disturbed sites. Sediment fences will be used where appropriate to limit wind and water erosion, and water trucks will be used in disturbed areas during construction to limit wind erosion.

2. Final erosion control and site restoration measures will be initiated as soon as a particular area is no longer needed for construction, stockpiling, or access. Clearing schedules will be arranged to minimize exposure of soils.

3. Cuts and fills for access roads and utility corridors will be sloped to prevent landslides and to facilitate revegetation.

4. Signs will be placed along the access road to discourage OHV use of adjacent areas.

5. Borrow areas will be contoured and shaped to carry the natural contour of adjacent undisturbed terrain into the borrow area.

6. Soil or rock stockpiles, excavated materials, or excess soil materials will not be placed near sensitive habitats, including washes, where they may erode into these habitats or be washed away by high water or storm runoff. Plastic will be placed over stockpiles to prevent wind erosion if the stockpiles are intended to be long-term. Waste piles will be revegetated using suitable native species after they are shaped to provide a natural appearance.

7. Treading on areas not immediately involved in project construction activities will be avoided to reduce potential wind erosion and fugitive dust generated during construction.

Pipeline and Utility Corridor Construction

1. Construction rights-of-way (ROWs) will be limited to the minimum practicable width.

2. The upper 12 to 18 inches of soil will be removed from the trench area and stockpiled for later use.

3. Surface elevations will be returned to pre-project conditions, taking into account expected settling.

4. Where the pipeline crosses fences, a wire gate will be installed to standard BLM specifications. The gates will be built prior to the corridor construction, and will be kept closed except during active construction at the fence site.

5. If construction activities cause damage to existing range improvements (such as pipelines, fences, troughs, etc.), they will be fixed using material that meets or exceeds the quality of the existing improvement. If damage occurs the BLM and livestock operator will be notified immediately. If damage occurs during active livestock grazing, repairs will be made within 24 hours.

6. Big Galleta grass will be included within the seed mix used to revegetate the disturbed corridor.

Biological Resources

1. Specific measures that will be implemented to protect desert tortoises and their habitat are described in Appendix A.

2. Bird nests encountered during land disturbing construction activities will be avoided while the birds are fledging. To the extent practicable, land disturbing construction activities will be scheduled outside of the breeding season (March 15 through July 30). If construction is required during the breeding season, the area impacted will be surveyed for nests prior to construction.

3. Collapsing suitable burrows or other potential nesting cavities within the construction zone prior to the nesting season can largely prevent direct impacts that may otherwise occur on burrowing owls. This will be accomplished, where appropriate, as part of the surveys for the desert tortoise. If owl-occupied burrows are located during their nesting or brooding season (mid-March through August), burrows will be avoided until the young owls leave the nest or it is determined that the nesting attempt failed.

4. Gila monsters in immediate danger from construction activities will be captured and confined in a cool, shaded environment by a biologist in accordance with NDOW regulations. Injured Gila monsters will be transferred to a veterinarian. Dead Gila monsters will be preserved for NDOW.

5. Impacts to chuckwalla will be minimized by restricting activity in upland areas occupied by this species. Chuckwallas typically hide in rock crevices and other similar shelters when approached or threatened, making it difficult to capture and relocate them. However, trained personnel will remove them prior to construction if necessary.

6. If significant bat roosts are located within or adjacent to a construction zone, the roost will be avoided until the animals naturally vacate the site. Certain types of bat refuges, such as winter roosts used by non-hibernating California leaf-nosed bats, will be completely avoided if practicable. Certain naturally occurring caves, and even some abandoned mines, can provide the necessary temperature regimes critical to maintaining some local bat populations.

7. Signs warning of bighorn sheep crossing will be placed along the access road in order to reduce potential mortalities resulting from collisions with vehicles.

8. Agency review and assessment of project-associated impacts on vegetation may precipitate a mitigation requirement to salvage various plants located inside the construction zone. Protected or otherwise sensitive plants (such as Joshua trees and numerous species of cactus and yuccas) will have to be identified and removed from the construction corridor prior to the onset of construction. Salvaged plants will then be held for replanting along construction zone margins, other project-affected areas (for example,

former equipment staging grounds), or alternate lands. Plant salvage activities will probably have the greatest likelihood for success if carried out in other than the spring flowering season.

9. Vegetation salvage and replanting will be implemented and completed as required by the BLM in accordance with their established guidelines. Adopting roadway signage that discourages off-road travel will help protect vegetation along road margins.

10. The project proponent will adhere to an integrated pest management plan prepared for the project.

Cultural Resources

Appendix C of this document contains the Cultural Resources Programmatic Agreement between BLM and the Nevada SHPO for the Toquop Energy Project. This Programmatic Agreement contains stipulations to ensure that those historic and prehistoric properties eligible for nomination to the National Register of Historic Places will be treated to avoid or mitigate project-related effects to the extent practicable and to satisfy BLM Section 106 responsibilities.

Reclamation

1. Reclamation will normally be accomplished with native species only. These will be representative of the indigenous species present in the adjacent habitat. Rationale for potential planting with selected non-natives will be documented. Possible exceptions could include use of non-natives for a temporary cover crop to out-compete weeds.

2. Seeding will occur during November 15 through March 15 to ensure a greater chance of success.

3. Reclamation release criteria are as follows:

    - 100 percent of the perennial plant cover of selected comparison areas, normally like adjacent habitat. If the adjacent habitat is severely disturbed, a range site description may be used as a cover standard. Cover is normally crown cover as estimated by the point intercept method. Selected cover can be determined using a method as described in *Sampling Vegetation Attributes, Interagency Technical Reference* (1996, BLM/RS/ST-96/002+1730). The reclamation plan for the project area will identify the site-specific release criteria and associated statistical methods in the reclamation plan or permit.

    - No noxious weeds will be allowed on the sites for reclamation release. Control of noxious weeds will follow an integrated pest management plan approved by the authorizing officer. A list of Nevada noxious weeds will be provided by the authorized officer.

4. All available growth medium will be salvaged and stockpiled prior to disturbance. All disturbance areas will be recontoured to blend as nearly as possible with the natural topography prior to revegetation. All compacted portions of the disturbance will be ripped to a depth of 12 inches unless solid rock is encountered. Adequate, fine-grain seedbed must be established to provide good seed to soil contact. Large blocks and clumps of soil with deep pockets should be avoided. This normally requires some type of tillage procedure after ripping.

5. All portions of access roads not needed for other uses as determined by the authorized officer will be reclaimed.

6. Mulching of the seedbed following seeding may be required under certain conditions, such as severe erosion.

7. The success of the vegetative growth on a reclaimed site may be evaluated for release no sooner than during the third growing season after earthwork and planting have been completed. Where it has been determined that revegetation success criteria have not been met, the agencies and the operator will meet to decide on the best course of actions necessary to meet the reclamation goal.

8. Where applicable, the following agencies will be consulted to determine the recommended plant species composition, seeding rates, and planting dates:

    - U.S. Fish and Wildlife Service (FWS)
    - U.S. Natural Resources Conservation Service (NRCS)
    - U.S. Bureau of Land Management (BLM)

9. Grasses, forbs, shrubs, and trees appropriate for site conditions and surrounding vegetation will be included on the plant list. Species chosen for a site will be matched for site drainage, climate, shading, resistance to erosion, soil type, slope, aspect, and vegetation management goals. Upland revegetation shall match the plant list to the site's soil type, topographic position, elevation, and surrounding natural communities.

10. Construction areas, including storage yards, will be free of waste material and trash accumulations at all times.

11. All unused materials and trash will be removed from construction and storage sites during the final phase of work. All removed material will be placed in approved sanitary landfills or storage sites and work areas will be left to conform to the natural landscape.

12. Upon completion of construction, any land disturbed will be graded to provide proper drainage and blend with the natural contour of the land. Following grading, it will be revegetated using plants native to the area, suitable for the site conditions, and beneficial to wildlife.

13. Following completion of construction, all yards, offices, and construction buildings, including concrete footings and slabs, will be removed from the site.

14. All temporary construction roads will be obliterated and restored to the original contour, and made to discourage vehicular traffic when no longer needed by contractors. Culverts will be removed as appropriate, road escarpments will be contoured and vegetated, and all road surfaces will be scarified to establish conditions appropriate for reseeding, drainage, and erosion prevention.

Visual Resources

1. All structures, stacks, buildings, and tanks will be constructed of materials that will restrict glare, and will be finished with flat tones intended to blend with the surrounding environment. The project applicant will consult with Lincoln County and BLM regarding the final selection of colors for the features of the property.

2. All fencing will be constructed of nonreflective materials, and will be treated or painted to blend with the surrounding environment.

3. Signs at the plant site will be constructed of materials that are nonglare, and will be painted using unobtrusive colors.

4. Lighting will be limited to areas required for safety and security, and will be shielded and directed downward to the extent possible.

5. Lighting will be directed and shielded to reduce light scatter and glare. Highly directional, high-pressure sodium vapor fixtures (or other fixtures that meet the criteria specified) will be used where practicable.

6. Switches will be used as appropriate to allow use of lighting only when needed.

7. The transmission structures would be finished with flat, neutral gray tones that would relate to the colors of the structures in the existing transmission corridors and that would blend with the surrounding environment.

8. Nonspecular conductors and nonreflective and nonrefractive insulators would be used to reduce conductor and insulator visibility.

Water Pollution Prevention and Monitoring

1. A groundwater monitoring plan will be developed by Toquop Energy and approved by BLM. Results of monitoring will be provided to the FWS and the Nevada State Engineer annually.

2. Pumped ground water will be monitored periodically to ensure its quality is suitable for power plant operation.

3. All federal and state laws related to control and abatement of water pollution will be complied with. All waste material and sewage from construction activities or project-related features will be disposed of according to federal and state pollution control regulations.

4. Activity with a high potential for causing sediment movement into washes will not be conducted during potentially high runoff periods, typically July and August.

5. All disturbed ephemeral washes considered to be waters of the United States will be reclaimed as soon as possible according to the conditions of a Section 404 Clean Water Act Permit. The highest standards for aesthetic value will be adhered to during restoration of the washbed. Where appropriate and as required by conditions of the Section 404 Permit, native species capable of bank stabilization will be used to revegetate all disturbed banks.

6. Diversion structures will be used to re-direct flows from the wash potentially impacted by the southern plant site and will be designed to minimize potential destabilization and erosion of adjacent and downgradient ephemeral washes.

7. Stormwater management plans will be implemented for project construction and facility operation to minimize and control erosion from stormwater runoff. Stormwater during project construction will be managed in compliance with applicable state and federal regulations, including compliance with requirements of the National Pollutant Discharge Elimination System (NPDES) stormwater general permits, which will be obtained for the project. Stormwater management elements will include:

    - Application of best management practices for erosion, sedimentation, and stabilization control during construction activities, and management of oils and other substances during operation to minimize contact with stormwater

    - Structural controls during operation that could include stabilized stormwater conveyance systems (swales), oil-water separators for runoff that comes in contact with affected plant site surfaces, and sedimentation detention basins

    - Monitoring and maintenance to ensure long-term effectiveness of the management system.

8. A stormwater retention basin will be constructed with sufficient dimensions to accommodate runoff from the impervious surfaces at the plant site generated by the local maximum daily rainfall event with a return frequency of 100 years or less. All runoff from the impervious surfaces will be directed to this retention basin prior to being released to the natural drainage system at flow rates equivalent to pre-development conditions. Stormwater runoff likely to contain contaminants will flow first to onsite treatment facilities (such as an oil-water separator), as appropriate, prior to being directed to the stormwater retention basin.

9. Construction specifications will require construction methods that prevent entrance or accidental spillage of pollutants into flowing or dry watercourses, and ground water sources. Potential pollutants and wastes include refuse, garbage, cement, concrete, sewage effluent, industrial waste, oil and other petroleum products, aggregate processing tailings, mineral salts, drilling mud, and thermal pollution.

10. Any construction wastewater discharged into surface waters will be essentially free of settling material. Wastewater from aggregate processing, concrete batching, or other construction operation will not enter drainages without water quality treatment. Turbidity control methods may include settling ponds; gravel-filter entrapment dikes; recirculation systems for washing aggregates; or other approved methods.

Transportation

To improve traffic flow at the one-lane underpass at the East Mesa Interchange during project construction, vehicles coming from opposing sides of the underpass will be required to give the right-of-way to the vehicle that arrived first at the underpass, in accordance with current traffic laws. At certain times during project construction (such as periods of heavy traffic at the underpass resulting from materials/equipment delivery coupled with construction worker transport vehicles and non-project traffic) traffic management will be implemented that could include, but not be limited to, the following:

1. Providing a traffic flag person at both ends of the one-lane underpass to direct traffic during periods of heavy traffic flow.

2. Scheduling project vehicles during peak construction periods so that they arrive at the one-lane underpass at intervals considered suitable to provide smooth traffic flow patterns.

3. Scheduling materials/equipment vehicle deliveries so that they do not arrive at the one-lane underpass during the beginning or end of a work shift.

4. See Noise and Air Pollution Prevention for traffic-related SOPs.

Noise and Air Pollution Prevention

1. Contractors will be required to comply with all applicable federal, state, and local laws and regulations concerning prevention and control of noise and air pollution. Contractors are expected to use reasonably available methods and devices to control, prevent, and reduce atmospheric emissions or discharges of atmospheric contaminants and noise.

2. Contractors will obtain applicable air quality permits before starting construction or operating equipment that will result in regulated atmospheric emissions. The approvals require best available control technology for regulated emissions vented through stacks and vents and sources of fugitive dust emissions. Methods such as wetting exposed soil or roads with water or chemical dust suppressants where dust is generated by passing vehicles will be employed.

3. Contractors will be required to reduce dust from construction operations and prevent it from causing a nuisance to people. To accomplish this, the following measures will be implemented:

   - For the duration of construction activities, actively disturbed areas will be stabilized through the use of wet suppression as required to meet ambient air quality standards. Surfactants may be used to aid in wet suppression, thereby reducing the volume of water required to effectively treat the site. Disturbed areas of the site, including storage piles not being actively used for a period of 1 week or longer, will be stabilized as appropriate to minimize dust emissions. Active stabilization may not be required if soil moisture or natural crusting is sufficient to limit ambient impacts.

   - Bulk material stored onsite that is a possible fugitive dust source will be actively wetted, as needed, to minimize ambient impacts. It is anticipated that the majority of the material will be used onsite upon arrival. Should bulk materials require onsite storage for an extended period of time, the application of active wet suppression or the installation of a porous wind fence will be used as necessary to minimize fugitive dust generation.

   - Many of the unpaved surfaces, such as onsite access roads, will be covered with gravel and watered as necessary to minimize dust generation.

   - Onsite fugitive dust emissions will be limited by reducing vehicle speeds and a combination of active and passive dust suppression measures. Additional mitigation practices will include the following:

     - Onsite access roads, parking lots, and lay-down areas will be maintained with a gravel cover to the maximum extent practical.

     - Traffic off maintained onsite access roads will be restricted and a posted speed limit of 15 miles per hour will be enforced to minimize emissions from unpaved road segments.

     - Unpaved road segments will be watered as necessary.

     - Gaseous emissions from mobile sources will be minimized by proper maintenance and tune-up of equipment.

Hazardous Material Storage, Handling, and Disposal and Safety Measures

1. Contractors will be required to comply with Nevada State Regulations established under the authority of the Federal Resources Conservation and Recovery Act of 1976.
2. "Hazardous material" means any substance, pollutant, or contaminant that is listed as hazardous under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 USC 9601 et seq., and its regulations (CERCLA). The definition of hazardous substances under CERCLA includes any "hazardous waste"

as defined in the Resource Conservation and Recovery Act of 1976 (RCRA), as amended 42 USC 6901 et seq., and its regulations. The term hazardous materials also includes any nuclear byproduct material as defined by the Atomic Energy Act of 1954 as amended, 42 USC 2011 et seq.

3. As necessary, process wastewater solid precipitant will be transported for disposal at a licensed landfill. Solid precipitant stored onsite will be covered until transported offsite for disposal.

4. Aboveground chemical tanks will be located within a containment structure that is paved and bermed, and that is sufficient to contain a release from the largest tank within the area, plus sufficient freeboard to prevent overflow. Tanks will be registered, constructed, and managed using accepted engineering best practices, which may include high-level alarms or indicators to prevent overflow and locking valves. Tanks will be subject to a regular inspection regime.

5. The potential for adverse impacts from oil and fuel spills will be reduced through careful handling and designation of specific equipment repair and fuel storage areas.

6. Outdoor oil storage areas will be bermed with a capacity sufficient to contain the oil inventory contained in the single largest tank/equipment plus sufficient freeboard to prevent overflow. These areas will be equipped with a normally locked valve. Regular inspections will determine if there had been a leak requiring special attention. Otherwise, the valve will be opened to drain any rainwater to a plant oil/water separator. Any oil collected in the separator will be pumped out and removed by a licensed oil disposal contractor.

7. Outdoor chemical and hazardous waste storage areas will be within diked containment areas. Chemicals and wastes will be stored in accordance with the fire safety, hazardous materials management, and hazardous waste management standards of practice, which include segregation of incompatibles, protection of water-reactive materials from precipitation or moisture, adequate aisle space, etc.

8. Waste materials known or found to be hazardous will be disposed of in approved treatment or disposal facilities in accordance with federal, state, and local regulations, standards, codes, and laws.

9. Solid waste will be stored in closed onsite roll-off bins. Recyclable materials will be separated from the solid waste stream. Solid waste will be collected periodically and transported to a local licensed landfill.

10. Generation of wastes during construction will be minimized through detailed estimating of materials needed and through efficient construction practices. Any wastes generated during construction will be recycled as much as feasible. Concrete waste will be used as fill onsite, or, if not suitable for reuse, will be removed to a local licensed landfill. Any non-recyclable wastes will be collected and transported to a local licensed landfill.

11. Fuels, lubricant chemicals, and welding gases used during construction will be in controlled storage until used. Any empty containers or waste material will be segregated in storage and properly recycled or disposed of by licensed handlers.

12. Concrete trucks will not be washed at construction sites. All spilled concrete will be removed from construction areas and disposed of properly.

13. Portable toilets will be provided for onsite sewage handling during construction and will be pumped out and cleaned regularly. Sewage will be treated onsite during operation of the power plant.

14. A Spill Prevention Control and Countermeasures Plan (SPCCP) will be put in place for project features and include the following:

    - Program components and assignments
    - Professional engineer certification coordinator
    - Site information
    - Site drainage and storm water management
    - Emergency procedures/spill response
    - Emergency reporting contacts
    - Tank schematics
    - Material safety data sheets
    - Management approval
    - Plans reviews and amendments
    - Personnel training
    - Reporting procedures/emergency reporting contacts
    - Site inspections
    - Notice to tank truck drivers
    - Spill, fire, and safety equipment

15. Operators of the Toquop Energy Project will provide onsite fire and emergency medical equipment and services; and develop a police, fire, and medical aid agreement with Lincoln County to provide additional personnel and services to the project site.

16. To minimize the exposure of personnel and equipment to potential flood hazards, construction activities in the washes will be scheduled to occur when the probability for flash flooding is minimal.

Appendix C

Cultural Resources Programmatic Agreement

Programmatic Agreement Among the USDI Bureau of Land Management, Nevada and the Nevada State Historic Preservation Officer Regarding the Toquop Energy Project

PROGRAMMATIC AGREEMENT
AMONG
THE USDI BUREAU OF LAND MANAGEMENT, NEVADA
AND
THE NEVADA STATE HISTORIC PRESERVATION OFFICER
REGARDING THE TOQUOP ENERGY PROJECT

WHEREAS, the BLM is considering an application for rights of ways and a proposed land exchange for the Toquop Energy Project proposed by Toquop Energy, Inc., ("Toquop") in southern Lincoln County, Nevada, and BLM is preparing an Environmental Impact Statement for this proposed project.

WHEREAS, the BLM has determined that if it approves this application and/or the land exchange, the construction and installation of the Toquop Energy Project (the undertaking) may have an effect upon properties eligible for inclusion in the National Register of Historic Places (NRHP), and has consulted with the Nevada State Historic Preservation Officer (SHPO) pursuant to the Nevada BLM/SHPO Protocol for implementing Section 106 of the National Historic Preservation Act;

WHEREAS, Toquop Energy, Inc., the operator of Toquop Energy Project, participated in the consultation and has been invited to concur in this Programmatic Agreement, and

WHEREAS, this Programmatic Agreement covers all aspects of the planning, construction, and installation of the undertaking, including but not limited to, power and communication transmission systems, generation stations, staging areas and access roads, the construction zone, extra work areas and all ancillary facilities;

NOW THEREFORE, the parties agree that development of the Toquop Energy Project, if it is approved by BLM, shall be administered in accordance with the following stipulations to ensure that historic and prehistoric properties will be treated to avoid or mitigate effects to the extent practicable, regardless of surface ownership, and to satisfy BLM Section 106 responsibilities for all aspects of the undertaking.

AREA OF POTENTIAL EFFECT

The Area of Potential Effect (APE) shall be defined to include all potential direct and indirect effects to cultural resources and Traditional Cultural Properties from any Toquop Energy Project activities associated with the undertaking, if it is approved by BLM. The initial specific APE is described and mapped in Appendix A. At the discretion of the BLM, the APE may be amended as needed and any amendments will be handled under the terms of this agreement.

STIPULATIONS

A. Identification

1. BLM shall identify interested persons and tribes pursuant to the BLM/SHPO Protocol and involve them, as appropriate, in all activities associated with the undertaking.

2. The BLM, in consultation with the SHPO, shall ensure that Toquop funds an appropriate cultural resource inventory, including reports, of the APE for all activity areas, or portions thereof, in a manner consistent with the BLM/SHPO Protocol.

3. Required inventory shall be completed regardless of the ownership (public or private) of the lands involved and Toquop shall be responsible for gaining access to privately held lands. Toquop's failure to gain access to private lands will result in a determination of adverse effect for the undertaking.

4. When found, previously recorded sites will be re-recorded using Intermountain Antiquities Computer System (IMACS) site record forms.

5. No artifacts will be collected during inventory activities.

6. Isolated artifacts and features will be documented in tabular form using the description, land form, legal location, and UTM.

B. Eligibility

1. The BLM, in consultation with the SHPO, shall ensure that all cultural resources located within the APE of an activity area are evaluated for eligibility to the NRHP prior to the initiation of activities that may affect cultural properties. Eligibility will be determined in a manner compatible with BLM/SHPO Protocol.

a. In addition, the BLM shall consult with appropriate tribes to identify properties considered to be of traditional religious and cultural importance.

2. To the extent practicable, eligibility determinations shall be based on inventory information. If the information gathered in the inventory is inadequate to determine eligibility, Toquop, through its contractors may need to conduct limited subsurface testing, or other evaluative techniques, to determine eligibility. Subject to approval by the BLM, in consultation with the SHPO, evaluative testing is intended to provide the minimum data necessary to define the nature, density and distribution of materials in potential historic properties, to make final evaluations of eligibility, and to devise treatment options responsive to the information potential of the property. Any such testing shall be limited to disturbing no more than 25% of the surface area of the resource. Should BLM disapprove the applications for the Toquop project, or should Toquop abandon the project and withdraw its applications prior to BLM approval, then any further evaluative testing shall cease, except for completing existing or already authorized work that is ongoing as of the date of withdrawal or disapproval.

3. If the BLM and SHPO disagree regarding eligibility, the BLM shall seek a formal determination of eligibility from the Keeper of the National Register in accordance with

36 CFR 800.4 (dated 1986). The Keeper's determination will be considered final.

C. Treatment

1. In avoiding or mitigating effects, the BLM, in consultation with SHPO and interested persons, shall determine the precise nature of effects to historic properties identified in the APE if the Toquop Project is approved by BLM. As a condition to any grant of rights of way or other BLM action to approve the Toquop Project, appropriate treatment shall be required prior to construction or operation of the Project. If the Project is approved by BLM, all treatment shall be done in a manner consistent with the BLM/SHPO Protocol.

2. If the Toquop Project is approved by BLM, to the extent practicable, BLM, in consultation with the SHPO, shall ensure that Toquop avoids effects to historic properties through project design, or redesign, relocation of facilities, or by other means in a manner consistent with the BLM/SHPO Protocol.

3. If the Toquop Project is approved by BLM, when avoidance is not feasible, the BLM, in consultation with SHPO, Toquop and interested persons, shall ensure that Toquop develops an appropriate treatment plan designed to lessen or mitigate project-related effects to historic properties. The treatment plan shall be a condition to the right of way, if the right of way is approved by BLM. For properties eligible under criteria (a) through (c) (36 CFR 60.4), mitigation, other than data recovery, may be considered in the treatment plan (e.g. HABS/HAER recordation, oral history, historic markers, exhibits, interpretive brochures or publications, etc.). Where appropriate, treatment plans shall include provisions (content and number of copies) for a publication for the general public.

4. If the Toquop Project is approved by BLM, when data recovery is proposed and required as a condition of approval, the BLM, in consultation with the SHPO, shall ensure that Toquop develops a data recovery plan that is consistent with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-37) and *Treatment of Historic Properties: A Handbook* (Council 1980).

6. If the Toquop Project is approved by BLM, upon completion of the consultation process, the BLM shall require as a condition of approval and ensure that Toquop, through its contractor, implements the fieldwork portions of any final treatment plan prior to initiating any activities that may affect historic properties

7. The BLM shall ensure that all records and materials resulting from identification and treatment efforts are curated in accordance with 36 CFR 79 in BLM-approved facilities in Nevada. All materials collected will be maintained in accordance with 36 CFR 79 until the final treatment report is complete and collections are curated or returned to their owners.

8. The BLM shall ensure that all final archeological reports resulting from actions pursuant to this Agreement will be provided to the SHPO and the Advisory Council on Historic Preservation (Council), and made available to other interested persons. All such reports shall be consistent with contemporary professional standards, and the Department of Interior's Formal Standards for Final Reports of Data Recovery Programs (42FR 5377-79).

D. Discovery Situations

1. If the Toquop Project is approved by BLM, and authorization has been granted for Toquop to proceed to construct or operate the undertaking, the following requirements shall apply. When cultural resources are discovered, undertaking-related activities within 100 meters of the discovery will cease immediately and Toquop shall notify the BLM authorized officer. Prior to initiating any activities within the APE, Toquop will provide the parties with a list of, and schedule for, the Toquop employees empowered to halt all activities in discovery situation and who will be responsible for notifying BLM of any discoveries. At least one of these employees will be present during all Toquop's activities.

(a) The BLM shall notify the SHPO and consider the SHPO's initial comments on the discovery. Within two working days of the discovery, the BLM shall notify Toquop, the SHPO and identified interested persons, of the BLM's decision to either allow undertaking-related activities to proceed or to require mitigation.

(b) If, in consultation with the SHPO, BLM determines that mitigation is appropriate, the BLM shall solicit comments from the SHPO and interested persons, as appropriate, to develop mitigating measures. The SHPO and other interested persons, as appropriate, will be allowed two working days to provide BLM with comments to be considered when the BLM makes a decision on extent of mitigative efforts. BLM will determine the mitigation required; within seven working days of BLM's notification to Toquop of the need for mitigation, BLM will notify the SHPO and appropriate interested persons of its decision and ensure that such mitigative actions are implemented.

(c) The BLM shall ensure that reports of mitigation efforts for discovery situations are completed in a timely manner and conform to the Department of Interior's Formal Standards for Final Reports of Data Recovery Program (42 FR 5377-79). Drafts of such reports shall be submitted to the SHPO for a 30-day review and comment as stipulated in H.2. Final reports shall be submitted to the SHPO, Council and interested persons for informational purposes.

(d) Toquop's activities in the area of the discovery will be halted until Toquop is notified by the BLM that mitigation is complete and activities can resume.

E. Other Considerations

1. The BLM shall ensure that all stipulations of this Agreement are carried out by the BLM, SHPO, Toquop, and all of its contractors or other personnel.

2. The BLM shall ensure that historic, architectural, and archaeological work conducted pursuant to this Agreement is carried out by, or under the direct supervision of persons meeting qualifications set forth in the Secretary of the Interior's Professional Qualification Standards (36 CFR 61) and who have been permitted for such work on public lands, by the BLM.

3. Toquop, in cooperation with the BLM and the SHPO, shall ensure that all its personnel, and all the personnel of its contractors, are directed not to engage in the illegal collection of historic and prehistoric materials. Toquop shall cooperate with the BLM to ensure compliance with the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470) on public lands and with Nevada statute NRS 383 for state and private lands.

4. Toquop shall bear the expense of identification, evaluation, and treatment of all cultural properties directly or indirectly affected by Toquop Energy Project-related activity. Such costs shall include, but not be limited to, pre-field planning, field work, post-fieldwork analysis, research and report preparation, interim and summary report preparation, publications for the general public, and the cost of curating project documentation and artifact collections. It is understood that BLM may decide not to approve the right of way applications or the land exchange for the Toquop Energy Project. Prior to any BLM decision to approve or disapprove the applications, Toquop has agreed to bear the expense of the identication and evaluation of cultural properties required as part of the cultural resources surveys necessary to obtain information for the Environmental Impact Statement. If BLM disapproves the applications, or if Toquop abandons or withdraws its pending application for right of way prior to a BLM decision, then Toquop shall bear no further expense for evaluation or treatment for any cultural properties except for completing existing or already authorized work that is ongoing as of the date of withdrawal or disapproval.

5. Identification, evaluation and treatment efforts may extend beyond the geographic limits of the right-of-way when the resources being considered extend beyond the right-of-way. No identification, evaluation or treatment efforts will occur beyond that necessary to gather data for the completion of the Section 106 process as agreed, prior to BLM's decision to approve or disapprove the submitted applications. If BLM disapprove the applications, or if the applications are withdrawn or abandoned, then no further identification, evaluation or treatment will occur except for completing existing or already authorized work that is ongoing as of the date of withdrawal or disapproval. .

6. Traditional Cultural Properties (TCPs) will be identified, evaluated, and treated through consultation with appropriate interested persons. Toquop can contract for data gathering to assist the BLM in identifying, evaluating and treating TCPs. However, formal consultation, as needed, will be done by the BLM. TCP identification, evaluation

and treatment efforts shall be consistent with BLM Manual 8160 and its associated handbook.

7. Information on the location and nature of all cultural resources, and all information considered to be proprietary by tribes, will be held confidential to the extent provided by the NHPA, NAGPRA, and ARPA.

8. The BLM shall ensure that any human remains, grave goods, items of cultural patrimony, and sacred objects, encountered during the undertaking are treated with the respect due such materials. In coordination with this Agreement, human remains and associated grave goods found on public land will be handled according to the provisions of the Native American Graves Protection Act (NAGPRA) and its implementing regulations (43 CFR 10). Human remains and associated grave goods found on state or private land will be handled according to the provisions of Nevada statute NRS 383.

9. The BLM and the Nevada State Historic Preservation Office (SHPO) have consulted formally and have discussed informally about various aspects of the Toquop Energy Project. In relation to the land exchange included as part of the Proposed Action (Appendix A), the BLM and SHPO have consulted and agreed that the area of Section 36, T.11S, R.69E, has been subject to cultural resources inventory adequate to identify the likelihood of historic properties, pending determination of whether any Traditional Cultural Properties are present. The BLM anticipates consultation with SHPO regarding a BLM proposal to subject Section 4, T.10S, R.69E to a Class 2-level cultural resources inventory. The BLM expects that the remainder of the proposed and alternative alignments, including those areas yet to be defined, will be subjected to Class 3 cultural resources inventory.

F. Monitoring

1. The BLM and the SHPO may monitor actions carried out pursuant to this Agreement.
2. Any areas that the BLM, in consultation with the SHPO, identifies as sensitive will be monitored by an appropriate professional or tribal representative during construction activities that may impact the area, if the applications are approved by BLM. Treatment Plans will contain monitoring plans as needed. Monitors shall be empowered to stop work to protect resources.

G. Notices to Proceed

If BLM decides to approve the submitted applications, the right of ways issued under these applications shall provide for the issuance of Notices to Proceed. Notices to Proceed (NTP) may be issued by the BLM to Toquop for individual construction activities as defined by Toquop in its Construction Plan, under any of the following conditions:

(a) the BLM and SHPO have determined that there are no cultural resources

within the APE for the construction segment;

(b) the BLM and SHPO have determined that there are no historic properties within the APE for the construction segment; or

(c) the BLM after consultation with the SHPO and interested persons has implemented an adequate treatment plan for the construction segment, and

(1) the fieldwork phase of the treatment option has been completed;

(2) the BLM has accepted a summary description of the fieldwork performed and a reporting schedule for that work; and

(3) Toquop has posted a surety as stipulated in I. below for post-fieldwork costs of the treatment plan.

H. Time Frames

1. Reports: The BLM shall review and comment on any report submitted by Toquop within 30 calendar days of receipt.

2. Consultation with Interested Parties: Prior to SHPO consultation, the BLM shall submit the results of all identification and evaluation efforts, including discovery situations, and treatment plans to identified interested persons for a 30-day review and comment period.

3. SHPO Consultation: The BLM shall submit the results of all identification and evaluation efforts, including discovery situations, and treatment plans to the SHPO for a 30-day review and comment period.

4. If any party to the agreement, or other interested person fails to respond to the BLM within 30 days of the receipt of a submission, the BLM shall presume concurrence with the BLM's findings and recommendations as detailed in the submission and proceed accordingly.

5. Reports: A draft final report of all identification, evaluation, treatment or other mitigative activities will be due to the BLM within nine (9) months after the completion of the fieldwork associated with the activity, unless otherwise negotiated.

6. Curation: All records, photographs, maps, field notes, artifacts, and other materials collected or developed for any identification, evaluation, or treatment activities will be curated in a facility approved by the BLM at the time the final report associated with that activity is accepted by the BLM, unless materials and artifacts must be returned to the owner.

I. Surety Bonds

1. If BLM decides to approve the applications for rights of ways, the terms of the rights of way(s) issued by BLM shall provide for the posting of sureties after such approval for the protection of cultural properties, as set forth below. If BLM decides to disapprove the application, then no surety shall be provided. Under the terms of any BLM approval of the proposed undertaking, Toquop will post a surety with the BLM in an amount sufficient to cover all post-fieldwork costs associated with implementing a treatment plan or other mitigative activities, as negotiated by Toquop when they contract for services in support of this Agreement. Such costs may include, but are not limited to post-field analyses, research and report preparation, interim and summary reports preparation, and the curation of project documentation and artifact collections in a BLM-approved curation facility. The surety shall be posted prior to BLM issuing a notice to proceed.

2. The surety posted as provided in Section I (1) above shall be subject to forfeiture if the post-fieldwork tasks are not completed within the time period established by the treatment option selected; provided, however, that the BLM and Toquop may agree to extend any such time periods. The BLM shall notify Toquop that the surety is subject to forfeiture and shall allow Toquop 15 days to respond before action is taken to forfeit the surety.

3. The surety shall be released, in whole or in part, as specific post-fieldwork tasks are completed and accepted by the BLM.

J. Dispute Resolution

1. If any party to this agreement, or an interested person, objects to any activities proposed pursuant to the terms of this agreement, the BLM shall consult with the objecting party and the SHPO to resolve the issue. If the objection cannot be resolved at the local level, the BLM shall request the assistance of the Council to help resolve the objection.

2. The Parties may continue all actions under this Agreement that are not the subject of the dispute.

K. Amendment

Any party to this Agreement may request that this Agreement be amended, whereupon the Parties will consult to consider such amendment.

L. Termination

Any party to this Agreement may terminate the Agreement by providing thirty (30) days notice to the other Parties, provided that the Parties will consult during the period prior to

termination to seek agreement on amendments or other actions that would avoid termination.

M. Execution

1. Execution and implementation of this Agreement evidences that the Parties have satisfied their Section 106 responsibilities for all actions associated with the construction and installation of Toquop Energy Project.

2. In the event that the Parties do not carry out the requirements of this Agreement or it is terminated, the BLM will comply with the provisions of the BLM/SHPO Protocol.

3. This Agreement shall become effective on the date of the last signature below, and shall remain in effect until terminated as provided in Stipulation L, or until undertaking is completed, or three years from the effective date.

CONSULTING PARTIES:

BUREAU OF LAND MANAGEMENT, NEVADA

By: _____ Date: 2/8/02

Title: Ely Field Manager

NEVADA STATE HISTORIC PRESERVATION OFFICE

By: Alice M Baldrica Date: 2/19/02

Title: Deputy SHPO

CONCURRING PARTY:
TOQUOP ENERGY, INC.

By: _____ Date: 02/6/02

Title: Its Authorized Agent
Christopher W. Garrett

APPENDIX A: AREA OF POTENTIAL EFFECT

The Toquop Energy Project includes three alternatives other than the No Action Alternate. These are discussed briefly below and are depicted in the attached figures.

The Proposed Action (or Southern Alternative) includes improvements (paving, widening, some straightening) to12.2 miles of existing Entry Road extending from Interstate Highway 15 in Clark County and into a proposed plant site in Lincoln County, Nevada; a land exchange of the federally-administered area of Section 36, T.11S, R.69E (Proposed Plant Site) in return for the privately-owned Section 9, T.20N, R.23E, in the Pah Rah Range in Washoe County, Nevada; construction of a natural gas-fired, water-cooled electrical generating facility in the Proposed Plant Site; construction of an underground Water Pipeline and related utility corridor to carry cooling water from Tule Basin to the proposed power plant site; and drilling of several water wells in the Well Field at locations that are yet to be determined, with connections between each well and the north end of the Water Pipeline within Section 4, T.9S, R.69E. However, the wells and their pipeline locations cannot be determined at present (November 2001) pending accumulation of additional information. The Proposed Action includes connections to both an existing natural gas pipeline (Kern River) as well as an existing electrical transmission line (Navajo-McCullough) within Section 36.

Alternative 1 is identical to the Proposed Action except for utilization of an eastern alignment for the Water Pipeline. This route is slightly longer (12.4 miles) and involves crossing Toquop Wash in order to avoid a nearby Area of Critical Environmental Concern.

Alternative 2 would involve development of the electrical generating plant in Section 4, T.10S, R.69E, which would be substituted as the federally-owned component utilized for the land exchange to acquire the privately-owned area of Section 9, T.20N, R.23E, in the Pah Rah Range in Washoe County, Nevada. The southern portion of the Entry Road would stay the same into Section 36, T.11S, R.69E, and would extend northward to Section 4 following the eastern alignment discussed in Alternative 1. The requirements for water wells in the Tule Desert remain the same, as would the connections between those wells and the alternative electrical generating plant site. The greatest difference would be in the requirement to connect between the electrical generating plant location in Section 4 and the natural gas supply and electrical transmission lines to the south. This would include improvements such as widening and paving along an additional 13.4 miles of road, as well as construction of 13.2 miles of buried gas line and an electrical transmission interconnection.

Appendix D

U.S. Fish and Wildlife Service Section 7 Consultation Letter: Species List for the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada

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	RR		
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	FIRE		
	C.F.		

Comments:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
NEVADA FISH AND WILDLIFE OFFICE
1340 FINANCIAL BOULEVARD, SUITE 234
RENO, NEVADA 89502

November 29, 2001
File No. 1-5-02-SP-431

Memorandum

To: Field Manager, Ely Field Office, Bureau of Land Management, Ely, Nevada (Attn: Dan Netcher, Team Leader)

From: Field Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada

Subject: Species List for the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada

Attached is a list of threatened and endangered species for the proposed Toquop Energy Project in Lincoln and Clark counties, Nevada. Attachment A lists those threatened and endangered species that *may* be present within, or in the vicinity, of this area. The attached species list applies to all three alternatives for the proposed Toquop Energy Project (the Proposed Action, Alternative # 1, and Alternative # 2).

This fulfills the requirement of the U.S. Fish and Wildlife Service to provide information on threatened and endangered species pursuant to section 7(c) of the Endangered Species Act of 1973, as amended (Act), for projects that are authorized, funded, or carried out by a Federal agency. Please reference the species list file number shown above in all subsequent correspondence concerning this project.

Attachment A also lists the species of concern to the Nevada Fish and Wildlife Office that may occur in the project area. We have used information from State and Federal agencies and private sources to assess the conservation needs and status of these species. Further biological research and field study are needed to resolve the conservation status of these taxa. One potential benefit of considering these species during project planning, is that by exploring alternatives early in the planning process, it may be possible to provide long-term conservation benefits for these species and avoid future conflicts that could otherwise develop. We also recommend that you contact the Nevada Natural Heritage Program (1550 East College Parkway, Suite 145, Carson City, Nevada 89710, 775-687-4245) and the appropriate regional office of the Nevada Division of Wildlife, as well as other local, State, and Federal agencies for distribution data and information

on conservation needs on these and other species of concern that may occur in your project area. Potential impacts to species of concern should be considered during the environmental documentation process.

The designation of critical habitat for the federally-endangered Virgin River chub and woundfin in the Virgin River was published in the Federal Register on January 26, 2000 (65 FR 4140). Since critical habitat for these two species occurs in the general vicinity of the proposed energy project, critical habitat should be considered when determining the effects of the proposed project on the Virgin River fishes. In particular, we are concerned with the possible effects of groundwater use on surface flows in the Virgin River, by facilities that would be constructed for the proposed Toquop Energy Project.

Although the project facility occurs outside designated critical habitat for the desert tortoise, the proposed road that would access the facility would traverse desert tortoise critical habitat (see attachments B-1, B-2, and B-3). Construction of the road would result in the loss of an unknown number of acres of critical habitat and may provide new public access to the area. The *Desert Tortoise (Mojave Population) Recovery Plan* recommends blocks of habitat that are roadless or otherwise inaccessible to humans, as a component of the reserve design for desert tortoise recovery areas. We are concerned that access roads such as the one proposed, will substantially impact the desert tortoise and its critical habitat. Thus, we encourage the Bureau of Land Management and project proponent to develop measures to minimize adverse effects to tortoise to the greatest extent practicable. We are available to assist with your efforts.

Because this project is located in or near a major wash, we ask that you be aware of potential impacts project activities may have on waters of the United States. Discharge of dredged or fill material into wetlands or waters of the United States is regulated by the Army Corps of Engineers pursuant to section 404 of the Clean Water Act. We recommend you contact the Regulatory Section of the Army Corps of Engineers' Reno Field Office (300 Booth Street, Room 2120, Reno, Nevada 89509, 775-784-5304) regarding the possible need for a permit.

Should you have further questions, please contact Jeri Krueger of the Southern Nevada Field Office, at (702) 647-5230.

Cynthia T. Martinez

for Robert D. Williams

Attachments

ATTACHMENT A

LISTED SPECIES, CANDIDATE SPECIES, AND SPECIES OF CONCERN THAT MAY OCCUR WITHIN THE VICINITY OF THE PROPOSED TOQUOP ENERGY PROJECT, LINCOLN AND CLARK COUNTIES, NEVADA

File Number: 1-5-02-SP-431
November 29, 2001

Listed and Candidate Species

Birds	
Yellow-billed cuckoo, Western Distinct Population Segment (C)	*Coccyzus americanus*
Southwestern willow flycatcher (E)	*Empidonax traillii extimus*
Yuma clapper rail (E)	*Rallus longirostris yumanensis*
Fishes	
Virgin River chub (E) ✦	*Gila seminuda*
Woundfin (E) ✦	*Plagopterus argentissimus*
Reptile	
Desert tortoise (T) ✦	*Gopherus agassizii*

E = Endangered; T = Threatened; C = Candidate
✦ Critical habitat designated in Nevada

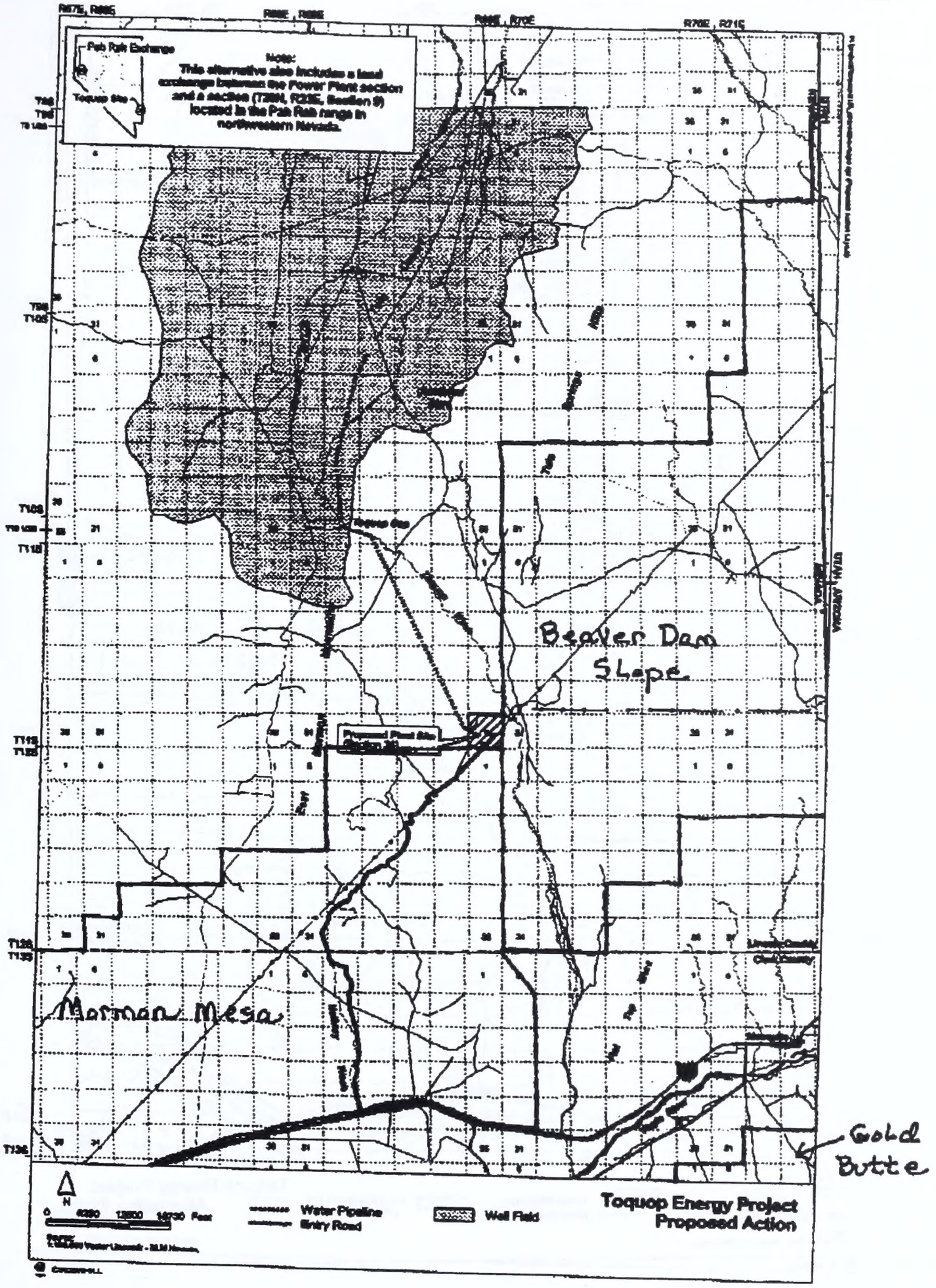
Species of Concern

Birds	
Western burrowing owl	*Athene cunicularia hypugea*
Black tern	*Chlidonias niger*
Blue grosbeak	*Guiraca caerulea*
American peregrine falcon	*Falco peregrinus anatum*
Least bittern	*Ixobrychus exilis hesperis*
Phainopepla	*Phainopepla nitens*
Summer tanager	*Piranga rubra*
White-faced ibis	*Plegadis chihi*
Vermilion flycatcher	*Pyrocephalus rubinus*
Lucy's warbler	*Vermivora luciae*
Arizona Bell's vireo	*Vireo bellii arizonae*

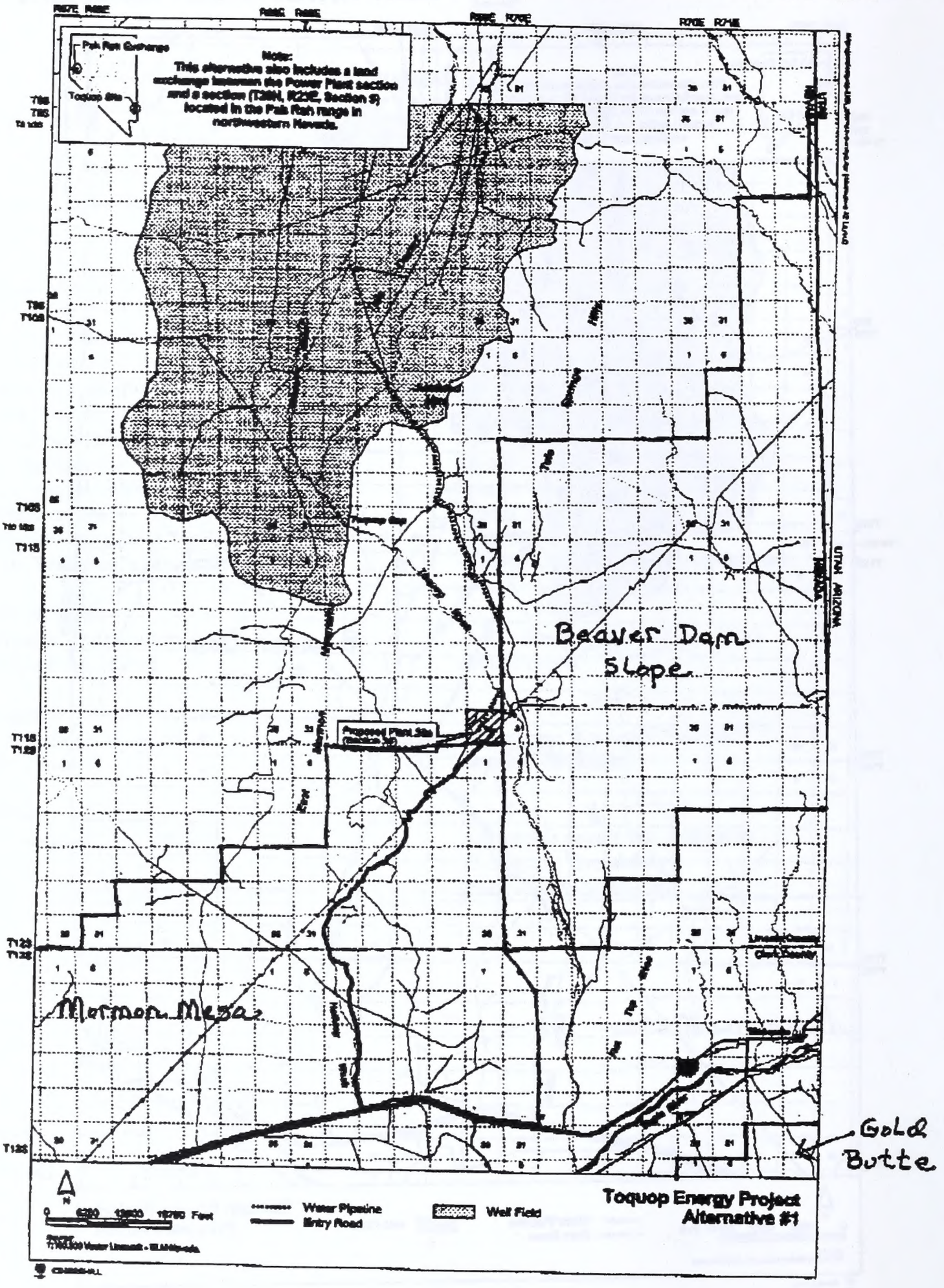
ATTACHMENT A (cont)
File No. 1-5-02-SP-431
November 29, 2001

Fish	
Virgin spinedace	*Lepidomeda mollispinis mollispinis*
Mammals	
Spotted bat	*Euderma maculatum*
Greater western mastiff bat	*Eumops perotis californicus*
Allen's big-eared bat	*Idionycteris phyllotis*
California leaf-nosed bat	*Macrotus californicus*
Small-footed myotis	*Myotis ciliolabrum*
Long-eared myotis	*Myotis evotis*
Fringed myotis	*Myotis thysanodes*
Long-legged myotis	*Myotis volans*
Yuma myotis	*Myotis yumanensis*
Big free-tailed bat	*Nyctinomops macrotis*
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*
Amphibians	
Arizona southwestern toad	*Bufo microscaphus microscaphus*
Relict leopard frog	*Rana onca*
Reptiles	
Banded Gila monster	*Heloderma suspectum cinctum*
Chuckwalla	*Sauromalus obesus*
Plants	
Threecorner milkvetch	*Astragalus geyeri* var. *triquetrus*
Sticky buckwheat	*Eriogonum viscidulum*
Beaver Dam scurfpea	*Pediomelum castoreum*

= Desert Tortoise Critical Habitat Units

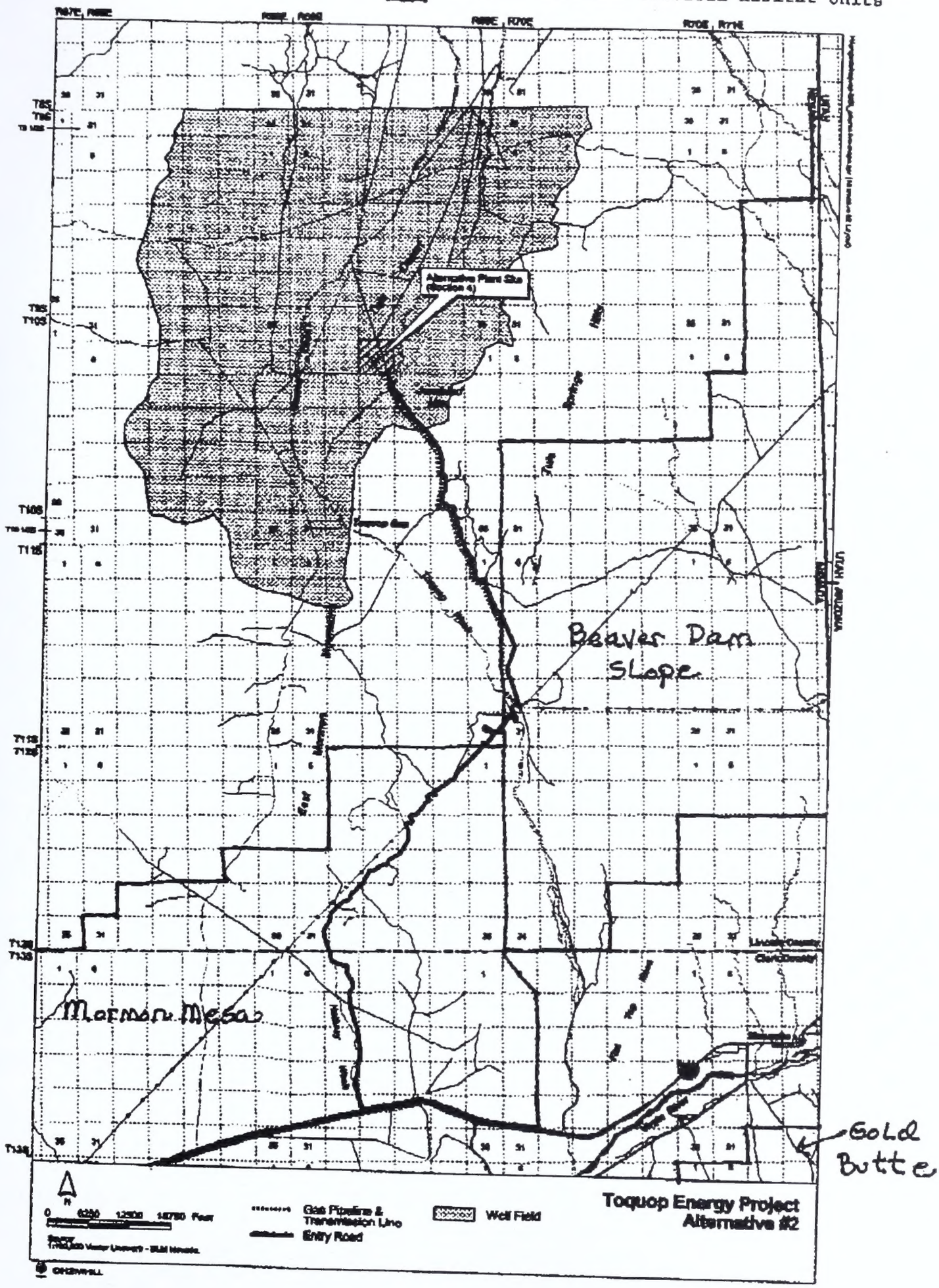


Attachment D-2 - Desert Tortoise Critical Habitat Units



Attachment D-3

= Desert Tortoise Critical Habitat Units



Appendix E

Salinity Effects on Birds

Salinity Effects on Birds

PREPARED FOR: Randy Schulze/DEN
Tom Haislip/BOI
Lynn Foster/BOI

PREPARED BY: Christine Arenal/SAC
Harry Ohlendorf/SAC

DATE: December 11, 2002

An evaporation pond will be utilized during the normal operation of the Toquop power plant. Because this surface water body will be located within an established flyway in an area with few water sources, it may attract waterfowl, shorebirds, and other waterbirds, thereby creating possible exposures of birds to highly saline water at the power plant.

The estimated water chemistry for the Toquop evaporation pond is outlined in Table 1 and is based on the Toquop Case CT07 water balance. For this case, the only influent to the evaporation pond is brine from the brine concentrator (side-stream softener sludge is disposed of off-site). The brine concentrator takes the pH-adjusted influent (125 gpm) and concentrates it to 15 gpm that flows to the evaporation pond as a solution that is saturated with respect to gypsum (CaSO4.H2O). Further concentration of the evaporation pond influent occurs due to evaporation. It has been assumed that the extent of the evaporation is not to dryness, but rather to a very concentrated brine that is on the verge of precipitating halite (NaCl) at a concentration ratio of approximately 16.8. The water is in equilibrium with solids consisting of gypsum (CaSO4.2H2O), and mirabolite (Na2SO4.10H2O). If further concentration occurs, halite would form next, followed by magnesium chloride hexahydrate.

Salinity is not precisely equivalent to TDS, but for most purposes, they can be considered equal (USEPA 1986, USDI 1998). Therefore, based on the values in Table 1, the total dissolved solids (TDS) estimated for the evaporation pond is approximately 387,000 ppm. Conductivity can be estimated from TDS, with TDS equaling approximately 0.55 to 0.7 times the conductivity (USDI 1998). Using the equation presented in USDI (1998), a conductivity of 567,800 Φmhos/cm can be estimated for the Toquop evaporation pond. However, the equation is specific to conductances between 5,000 and 9,000 Φmhos/cm, and CH2M HILL (2002) found that the relationship between TDS and conductivity at Owens Lake, California was non-linear above TDS concentrations of 125,000 ppm. Moreover, TDS began to exceed conductivity in the Owens Lake study at TDS values greater than 100,000 ppm. Using this relationship, the estimated conductivity in the Toquop evaporation pond is about 170,000 Φmhos/cm at a TDS of approximately 387,000 ppm. Both estimates are for standard temperature (25° C). As temperature decreases, conductivity also decreases, reaching about half its value at 25° C by 0° C (CH2M HILL 2002). Therefore, the conductivity could drop to lows of 85,000 to 283,900 Φmhos/cm (using the two values estimated above) just prior to freezing.

The ions in the pond water (e.g., Na+, K+, Cl-, and SO_4-) are generally non-toxic and are not considered problematic to wildlife at normal environmental levels. However, the estimated TDS and sodium levels for the evaporation pond may pose risk to birds. Table 2 lists biological effects observed at various salinity concentrations. For sodium, levels as low as 821 ppm reduced growth in 1-day-old mallard ducklings exposed for 28 days (Mitcham and Wobeser 1988a). Mallard ducklings that drank water with 3,000 ppm of sodium had reduced thymus size and bone strength (Mitcham and Wobeser 1988b). No apparent effects were observed at concentrations up to 911 ppm in 14-day mallard duckling exposures, while concentrations between 8,800 and 12,000 ppm caused 100 percent mortality (Mitcham and Wobeser 1988a). In adult waterfowl, sodium concentrations of 17,000 ppm of sodium caused a die-off in North Dakota when fresh water was unavailable (Windingstad et al. 1987). Fry (2002) investigated waterfowl deaths near process ponds on Searles dry lake bed in California. Although brain sodium levels were high and sodium concentrations in pond waters averaged 89,567 ppm, the author could not rule out dehydration from lack of a freshwater source as the cause of the increased tissue levels of sodium.

Sodium toxicosis was also observed in ruddy ducks utilizing ponds located in an agricultural evaporation basin in California (Gordus et al. 2002). Sodium levels in the two ponds were 16,000 and 39,000 ppm, and associated electroconductivity values in the two ponds were 51,000 and 100,000 Φmhos/cm, respectively. These high levels of conductivity coupled with low ambient temperatures (<4° C) resulted in salt encrustation on the feathers of the ducks and reduced their ability to fly to freshwater sources. Salt encrustation on waterfowl feathers and mortality were also observed by Wobeser and Howard (1987) in a hypersaline wetland with high conductivity (77,000 Φmhos/cm) during periods of low temperature (3° C). Fry (2002) also reported encrustation of salt on waterfowl carcasses found near hypersaline processing ponds. Salt encrustation on the feathers of waterfowl or other waterbirds resulted in the inability of the birds to fly, which sometimes resulted in their death (possibly by drowning).

Concentrations of sodium (147,963 ppm) expected in the Toquop evaporation pond far exceed those associated with adverse effects in waterfowl; therefore, risk of mortality in waterfowl utilizing the pond is likely. Additionally, salt encrustation reportedly occurs when temperatures drop below 4° C and conductivity is at least 70,000 Φmhos/cm (Gordus et al. 2002). Even the lowest conductivity estimate (85,000 Φmhos/cm) exceeds this threshold. Therefore, salt encrustation of feathers, and ultimately death of birds, is likely to occur if birds use the evaporation pond.

We recommend that the evaporation pond should be monitored for waterbird use and possible effects on birds (i.e., salt encrustation or sick birds). This would be most important during spring and fall migration periods as well as during periods of cold weather. If birds are found to use the pond and exhibit salt encrustation on feathers or illness associated with salt exposure, an adaptive management program could be implemented. Covering ponds with netting and aggressive hazing programs were successful in reducing avian mortality around the processing ponds at Searles Lake, California (Fry 2002). Additionally, a brackish water pond was created near the processing ponds to provide a source of suitable drinking water. Gordus et al. (2002) also suggest aggressive hazing programs along with dilution of the ponds by adding low-salinity or freshwater to decrease salinity and addition of a brackish or freshwater wetland. Thus, hazing, providing alternative water sources, and

netting of the evaporation pond could mitigate the effects of bird exposure to water in the evaporation pond. To facilitate netting of the ponds (in the event of unacceptable levels of bird mortality), we recommend that during final design of the pond, consideration be given to configuring the pond in such a way that it could be covered with netting in the future if it is needed to preclude bird use.

TABLE 1
Water Chemistry for the Toquop Power Plant Evaporation Pond Liquid at 16.8x Concentration Ratio

Constituent	Measurement
Total Alkalinity, ppm CaCO3	0
pH	7.0
Silica	150
Calcium, ppm Ca	330
Magnesium, ppm Mg	3,091
Potassium, ppm K	13,692
Sodium, ppm Na	147,963
Chloride, ppm Cl	220,000
Nitrate, ppm NO3	10,466
Sulfate, ppm SO4	1,975

TABLE 2
Salinity Toxicity Data (from Table 30 in USDI 1998)

Species	Salinity Concentration in Water (ppm)	Effects/Comments	Reference
Mallard	~ 11,000	Reduced growth	Swanson et al. 1984
	8,800 – 12,000 (as sodium)	100 percent mortality	Mitcham and Wobeser 1988a
	9,000 – 12, 000	No Effect	Nystrom and Pehrsson 1988
	10,000 – 15,000	Level of concern	Swanson et al. 1984
	15,000	100 percent mortality (7-day old ducklings)	Barnes and Nudds 1991
Mottled Duck	9,000	Threshold level for adverse effects	Moorman et al. 1991
	12,000	Reduced growth, 10% mortality	
	15,000	90% mortality	
	18,000	100% mortality	
Peking Duck	20,000	Level of concern	Nystrom and Pehrsson 1988

References

Barnes, G., and T.D. Nudds. 1991. Salt tolerance in American black ducks, mallards, and their F1 hybrids. *The Auk* 108:89-98.

CH2M HILL. 2002. Brine Properties. Technical Memorandum prepared for the Los Angeles Department of Water and Power. September.

Fry, D.M. 2002. Report on the Mortality of Birds at Searles Dry Lake Bed, and Evaluation of Searles Lake Bed as Avian Habitat. Report for the California Regional Water Quality Control Board. IMC Chemical, Trona, CA. February 27.

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Moorman, A.M., T.E. Moorman, G.A. Baldassarre, and D.M. Richard. 1991. Effects of saline water on growth and survival of mottled duck ducklings in Louisiana. *Journal of Wildlife Management* 55:471-476.

Nystrom, K.K.G., and O. Pehrsson. 1988. Salinity as a constraint affecting food and habitat choice of mussel-feeding diving ducks. *Ibis* 130:94-110.

Swanson, G.A., V.A. Adomaitis, F.B. Lee, J.R. Serie, and J.A. Shoesmith. 1984. Limnological conditions influencing duckling use of saline lakes in south-central North Dakota. *Journal of Wildlife Management* 48:340-349.

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U.S. Environmental Protection Agency (USEPA). 1986. Quality Criteria for Water 1986. U.S. Environmental Protection Agency, Office of Water Regulations and Standards, Washington, D.C. EPA/440/5-86/001.

Windingstad, R.M., F.X. Kartch, and R.K. Stroud. 1987. Salt toxicosis in waterfowl in North Dakota. *Journal of Wildlife Diseases* 23:443-446.

Wobeser, G., and J. Howard. 1987. Mortality of waterfowl on a hypersaline wetland as a result of salt encrustation. *Journal of Wildlife Diseases* 23:127-134.

Appendix F

Section 404(b) 1 Guidelines Assessment for the Toquop Energy Facility

APPENDIX F

Section 404(b)1 Guidelines Assessment for the Toquop Energy Facility

This Appendix presents a summary of the Proposed Action's impacts to waters of the United States and evaluates the impacts according to the Section 404(b)1 Guidelines.

I. Proposed Project

Chapter 2 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project,* presents a detailed description of the Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and Toquop Energy Project.

The project would be located primarily in Lincoln County, Nevada, but a portion of one project feature—the access road to the power plant site—would be in Clark County, Nevada. Prominent landmarks in the project area include Interstate 15 (I-15) and the Virgin River to the south, the Tule Desert and Tule Spring Hills to the north, and the East Mormon Mountains west of the power plant site .

Project features, their operation, and associated actions of the Proposed Action include the following primary elements:

- Issue ROWs by the BLM for constructing and operating the power plant and all related facilities
- *Proposed Toquop Land Disposal Amendment to the Caliente MFP* to identify the southern plant site as suitable for disposal through sale or exchange
- Complete a land exchange between the BLM and NLRC to place the proposed plant site into private ownership
- Construct and operate a 1,100-MW (maximum) combined cycle, natural gas-fired, water-cooled electric generating plant, with connections to a natural gas pipeline and electric transmission lines
- Drill up to an estimated 15 wells in the Tule Desert Basin (Hydrographic Basin #221) over the life of the project sufficient to produce an annual average flow of 3,800 gallons per minute (gpm) (7,100 gpm peak daily) of water for the power plant. It is estimated that the power plant could use up to 7,000 acre-feet of water per year.
- Construct and operate a 12.5-mile-long, 24-inch-diameter buried water pipeline extending from the wellfield in the Tule Desert, through Toquop Gap, to the power plant near the Toquop Wash
- Construct and operate a manifold collection system to interconnect the water output from the wellfield to a pressure-regulating water tank
- Construct and operate a pressure-regulating water tank located near the wellfield before the water pipeline to the power plant

- Construct and operate buried electric distribution power lines from the power plant to the well pumps

- Pave to a width of 24 feet and straightening sections of 14.4 miles of an existing dirt and gravel road (locally known as the Halfway Wash Road and utility corridor road) to produce an access road extending from I-15 to the plant site

- Provide a 12.5-mile-long access right-of-way along an existing dirt and gravel road for maintenance activities between the power plant and the ground water wellfield

A. Specific Activity that Requires a Department of the Army Permit

Specific activities requiring a Department of Army permit (Clean Water Act Section 404) include fill activities associated with construction of roadway improvements for the access road to the Toquop Energy Facility, construction of the plant site, and construction of the water pipeline.

B. Purpose and Need

1. Purpose and Need

The purpose and need for the proposed project, as described in Section 1 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*, is as follows:

The proposed plant would generate electrical power at competitive costs for use by consumers to ease the near- and long-term shortages of power in the western United States. The proposed project would contribute to meeting the demand for power in the Western Systems Coordinating Council (WSCC) service area, including the Las Vegas area, and would also contribute to meeting the capacity and annual energy requirements for the remainder of the Arizona-New Mexico-southern Nevada power area.

The project would provide economic benefits to Lincoln County, Nevada, which will provide opportunities for additional industrial development resulting in an increased tax base and increased employment opportunities.

Responding to a request for a land exchange, the project would provide the BLM with a mechanism for acquiring a desirable parcel of private land in the Pah Rah Range in northwestern Nevada and would facilitate public land management by the BLM by creating contiguous tracts of land.

The WSCC estimates a demand for approximately 11,300 MW of new power plant generation to be constructed in its region of the western United States over the next 10 years to maintain reliable operation of the transmission system. The Toquop project would provide much needed support to the overall energy supply in this region and contribute approximately 10 percent of the projected demand for new generation within the WSCC. Based on data available from the WSCC, the 2002 Operating Reserve Margin (the difference between available capacity, excluding transfers, and peak demand) for the Las Vegas area and the Arizona-New Mexico-southern Nevada area is minus 2.9 percent. This indicates that the area relies on importing electricity to meet peak demands. This situation is the result of

growth in the demand for electricity to serve a fast growing region. The proposed project would significantly strengthen the electric grid in the Las Vegas area, including the City of Mesquite, based on the flow of electric power on the existing transmission system.

Needed and desired economic benefits would result from the construction and operation of the power plant. Lincoln County is approximately 98 percent public land with limited industrial and commercial development. Lincoln County ranks near the bottom among Nevada's counties in population, total personal and per capita income, and tax revenues. Development of the proposed power plant and associated linear facilities would provide important increases to the Lincoln County tax base through sales, use, and property taxes on the power plant improvements. The construction and operation of the power plant would have positive effects on employment opportunities and result in increased revenue from project-related purchases of goods and services.

The land exchange would be between NLRC and BLM's Ely Field Office. NLRC owns over 1.2 million acres of land in northern Nevada, lying in a checkerboard pattern interspersed with other privately owned and federally managed public lands. Much of the NLRC land has many resources desirable to the BLM (such as sage grouse habitat) and is identified for acquisition in BLM land use plans. Since certain disposable BLM-managed lands are desirable for economic development by NLRC, this land exchange would benefit both parties and the general public.

2. Overall Project Purpose for 404(b)(1) Alternatives Analysis

Purpose

The proposed plant would generate electrical power at competitive costs for use by consumers to ease the near- and long-term shortages of power in the western United States. The proposed project would contribute to meeting the demand for power in the Western Systems Coordinating Council (WSCC) service area, including the Las Vegas area, and would also contribute to meeting the capacity and annual energy requirements for the remainder of the Arizona-New Mexico-southern Nevada power area.

The project would provide economic benefits to Lincoln County, Nevada, which will provide opportunities for an increased tax base and increased employment opportunities.

The project would provide the BLM with a mechanism for acquiring a desirable parcel of private land in the Pah Rah Range in northwestern Nevada and would facilitate public land management by the BLM by creating contiguous tracts of land.

Need and Background

The WSCC estimates a demand for approximately 11,300 MW of new power plant generation to be constructed in its region of the western United States over the next 10 years to maintain reliable operation of the transmission system. The Toquop project would provide much needed support to the overall energy supply in this region and contribute approximately 10 percent of the projected demand for new generation within the WSCC. Based on data available from the WSCC, the 2002 Operating Reserve Margin (the difference between available capacity, excluding transfers, and peak demand) for the Las Vegas area and the Arizona-New Mexico-southern Nevada area is minus 2.9 percent. This indicates that the area relies on importing electricity to meet peak demands. This situation is the result of growth in the demand for electricity to serve a fast growing region. The proposed project

would significantly strengthen the electric grid in the Las Vegas area, including the City of Mesquite, based on the flow of electric power on the existing transmission system.

Needed and desired economic benefits would result from the construction and operation of the power plant. Lincoln County is approximately 98 percent public land with limited industrial and commercial development. Lincoln County ranks near the bottom among Nevada's counties in population, total personal and per capita income, and tax revenues.

Development of the proposed power plant and associated linear facilities would provide important increases to the Lincoln County tax base through sales, use, and property taxes on the power plant improvements. The construction and operation of the power plant would have positive effects on employment opportunities and result in increased revenue from project-related purchases of goods and services.

The land exchange would be between NLRC and BLM's Carson City Field Office. NLRC owns over 1.2 million acres of land in northern Nevada, lying in a checkerboard pattern interspersed with other privately owned and federally managed public lands. Much of the NLRC land has many resources desirable to the BLM (such as sage grouse habitat) and is identified for acquisition in BLM land use plans. Since certain disposable BLM-managed lands are desirable for economic development by NLRC, this land exchange would benefit both parties and the general public.

3. Corps' Determination of Basic Project Purpose (Water Dependency Test)

The basic project purpose is to construct and maintain the Toquop Energy Facility. The 404(b)(1) Guidelines concepts of basic project purpose and water dependency apply only when projects discharge dredged or fill material into a special aquatic site. Since there are no special aquatic sites within the scope of this project, the presumption of available practicable non-special aquatic alternative sites does not apply.

C. Scope of Analysis under National Environmental Policy Act (NEPA)

The scope of analysis encompasses the Proposed Action for the Toquop Energy Facility, which includes the improved roadway access to the project site, the Energy Facility Site itself, and the proposed water pipeline between the proposed well field and the Energy Facility.

The Proposed Action would not affect wetlands or riparian zones present at springs because these resources do not occur at the proposed sites of project features. The Proposed Action would affect a number of named and unnamed ephemeral washes. Named ephemeral washes that would be affected by the Proposed Action include Halfway Wash, Toquop Wash, South Fork Toquop Wash, and Sam's Camp Wash.

Jurisdictional delineations of waters of the United States were reviewed by Grady McNure of the U.S. Army Corps of Engineers during a site visit on November 14, 2002. The proposed access road would cross approximately 38 ephemeral washes, including Halfway Wash, that either intersect or parallel the proposed roadway. Two small ephemeral washes are located within the proposed plant site. These washes are approximately 8 feet wide and flow into Toquop Wash. The proposed water pipeline would affect ten ephemeral washes, including Toquop Wash, South Fork Toquop Wash, and Sam's Camp Wash. The proposed water

pipeline would be located within and parallel to the streambed of the Toquop Wash within the Toquop Gap. The proposed pipeline would parallel the Toquop Wash streambed for an estimated 2,000 feet. The pipeline alignment within Toquop Gap will be refined during the final engineering design phase to specifically minimize impacts to areas of riparian vegetation within the Gap. The impacts associated with the installation of the proposed water pipeline would be temporary impacts because the right-of-way would be restored to pre-construction contours upon completion of construction activities.

Alternatives (33 CFR 320.4(b)(4), 40 CFR 230.10)

1. No Action Alternative

Under the No Action Alternative, the Caliente MFP would not be amended, none of the project-related land exchanges would occur, project-related rights-of-way would not be created, and the power plant and related facilities would not be built or operated as described for the Proposed Action or the Action Alternatives.

If the No Action Alternative is selected for implementation, existing conditions and trends that are described for the affected environment in *Chapter 3, Affected Environment*, of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*, would continue. None of the project purposes and needs that are described in Section 1.2 and 1.3 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* (and presented above) would be met.

2. Sequenced Search for Less Environmentally Damaging Alternatives

a. Other Sites

Alternative project locations were considered but eliminated from consideration because they would not meet the project purposes and needs described in Chapter 1 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* and presented above. The project area was selected because it presents the greatest benefits to all parties involved, including: benefits to Toquop Energy and consumers through the cost-effective generation and sale of electric power to help meet local and regional shortages; to the BLM through their acquisition of a desirable parcel of land that is presently in private ownership; and to Lincoln County through increased economic benefits associated with project development. Alternative project locations presented unacceptable environmental impacts (proximity to Class I areas and Areas of Critical Environmental Concern [ACECs]); greater impairment of visual, biological, and ground water resources; difficulty and additional costs for fuel delivery and transmission line access; and lack of economic benefits to communities within and near Lincoln County.

b. Other Project Designs

Alternative 1

BLM actions that could occur under Alternative 1 include issuing ROWs necessary for project construction and operation, proceeding with this Proposed Toquop Land Disposal Amendment to the Caliente MFP, and completing the Toquop land disposal through sale or exchange. The ROW issued by the BLM for the construction and operation of a water

pipeline and buried electric distribution power lines under Alternative 1 would be for an eastern rather than a western alignment.

The water pipeline would follow a more easterly alignment under Alternative 1 than under the Proposed Action. This eastern alignment would follow the existing road that extends south-southeast from the Tule Desert to the Toquop Wash plant site, with one exception. On its southern end, the pipeline would depart from the road and follow along the west side of a range line south for about 3 miles in order to avoid the FWS-designated desert tortoise critical habitat, which is on the east side of the rangeline in this area (see Map 2-2 and desert tortoise discussions in Section 3.1, Threatened, Endangered, and Sensitive Species). The ground water well pumps would pump directly to a raw water storage tank located on an intermediate high point several miles southeast of the wellfield. The aboveground storage tank (configuration and color to be determined during final design to blend with background conditions) would then feed the water by gravity to the power plant. The storage tank would have a capacity of approximately 500,000 gallons and disturb no more than 1 acre of land. Electric distribution power lines from the power plant to the well pumps would be buried adjacent to the water pipeline.

The total length of this water pipeline would be 12.6 miles, or 0.1 mile longer than the more westerly route described for the Proposed Action. Its construction ROW (60 feet wide and 92 acres) and long-term right-of-way (30 feet wide and 46 acres) would be nearly identical in size to the western alignment under the Proposed Action. It would also have three 3-acre staging areas for construction: one near the north end; one near the mid-point of the pipeline; and one in the power plant site. Because the acreage for the third site is included in the total for the power plant site, water pipeline staging areas are considered to total 6 acres. All disturbed lands within these rights-of-way and staging areas would be reclaimed. Approximately 85 percent of the pipeline would run next to the existing road. This would provide easier, quicker access than the western alignment for larger vehicles should major maintenance or repair be necessary. In addition to being slightly longer, this alternative pipeline route would cross the main stem of the Toquop Wash at one of its deepest points (140 feet).

Alternative 2

BLM actions that could occur under the Alternative 2 include issuing ROWs necessary for project construction and operation, proceeding with this Proposed Toquop Land Disposal Amendment to the Caliente MFP, and completing the Toquop land disposal through sale or exchange.

However, specific actions could differ because of differences in the parcels of land to be disposed, location of the power plant site, and the nature and extent of the utility corridor and access road (see Map 2-3). In addition to the ROWs described for the Proposed Action, the BLM would issue ROWs for the construction and operation of an extended access road, a buried natural gas pipeline, and an overhead electric transmission line corridor that would be necessary for this northern power plant site. However, the water pipeline ROW would not be needed for this alternative. The BLM could amend the Caliente MFP in order to identify a parcel of public land in the Tule Desert in Lincoln County that is presently being managed by the BLM as being suitable for disposal through sale or exchange. The Tule Desert parcel would then serve as the power plant site under Alternative 2.

Locating the power plant in the Tule Desert under Alternative 2 would require the construction of 12.0 miles of buried natural gas pipeline to bring fuel to the site, and 12.0 miles of an overhead electric transmission interconnection to carry net power production to the Navajo-McCullough Electric Transmission Line and the Red Butte-Harry Allen Electric Transmission Line. It is anticipated that the gas pipeline would be 20 inches in diameter and the transmission interconnection would be 500-kV and 345-kV overhead lines, similar to the receiving transmission line. Both lines would be placed in a 120-foot-wide right-of-way adjacent to an existing road. Because of its width, construction staging areas would be located within the right-of-way.

Constructing an additional 12.2 miles of access road would be required to reach the plant site under Alternative 2. This access road would continue from its proposed terminus described for the Toquop Wash power plant site under the Proposed Action, cross the Toquop Wash, proceed north through desert tortoise critical habitat (but outside an ACEC) for approximately 4.3 miles to the range line, then continue along the existing dirt road alignment to the Tule Desert plant site. This alignment would involve extensive grading, sub-base preparation, straightening, and paving of this primitive road, except where the road crosses the Toquop Wash. At this location, the road would only be smoothed and flattened slightly to facilitate the passage of larger construction equipment. In the event of intermittent flooding, access across the Toquop Wash would be delayed until flood waters subside or, alternatively, the power plant site would be accessed via the Carp-Elgin Road.

Alternative 3

BLM actions that could occur under the Proposed Action include issuing ROWs necessary for project construction and operation, proceeding with this Proposed Toquop Land Disposal Amendment to the Caliente MFP, and completing the Toquop land disposal through sale or exchange. However, the power plant would be air-cooled. Map 2-6 shows the detailed location of the power plant site for Alternative 3.1

II. NEPA Environmental Factors and Public Interest Factors Considered

A. Anticipated Changes to the Physical/Chemical Characteristics of the Aquatic Environment

1. Substrate

The Proposed Action would not adversely impact portions of the waters of the United States' ephemeral wash substrate outside of the project area. Alluvial deposits within portions of the ephemeral washes within the project area appear to be homogeneous in composition. Construction activities are not expected to expose substrate material that substantially varies in composition or chemistry from the current substrate.

2. Currents, Circulation or Drainage Patterns

Currents and circulation are generally not significant factors in ephemeral stream hydrology. The proposed project is located in ephemeral washes and normal flows are

generally restricted to storm event runoff. There is no established permanent or fluctuating baseflow within the ephemeral washes. The Proposed Action would most likely create localized variations in the hydraulic characteristics of each of the washes during flow events. The overall cumulative impact of the localized variations, however, is expected to be relatively insignificant, and localized within the vicinity of the Proposed Action.

3. Suspended Particulates; Turbidity

The Proposed Action would most likely cause temporary increases in suspended particulates and turbidity within the ephemeral washes during storm runoff events that may potentially occur during construction. This effect is expected to be minor, however, and would cease at the completion of construction. Surface flow is not usually present and may be present for only a short time following heavy rainfall.

4. Water Quality (Temperature, Salinity Patterns and Other Parameters)

Both project construction and operation in the Toquop area provide opportunity to potentially affect the surface water quality of the local washes and, in turn, the Virgin River. Water quality in the washes could be degraded by the addition of both suspended solids (sediment) and dissolved constituents (substances commonly found in stormwater runoff from parking lots and industrial areas).

During construction, earthmoving activities could increase the potential for erosion from precipitation, which, in turn, would contribute additional suspended solids (sediment load) to the runoff in the local washes. During operation, diverted runoff from the wash filled in to accommodate construction of the power plant could increase the potential for erosion, and, therefore, result in increased sediment loads in the receiving wash(es).

In addition, runoff from parking surfaces and possibly areas where plant equipment could come in contact with precipitation could add low concentrations of dissolved petroleum hydrocarbons, metals, and possibly other substances to the runoff in the local washes. Runoff from the access road could also contribute low concentrations of similar dissolved substances to the flows in the local washes.

With the implementation of commitments in Appendix B of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*, no impacts to surface water quality are anticipated from the utilities that link the wellfield to the plant site, or from the development and operation of the wellfield.

5. Flood Control Functions

The effect to flood control functions under the Proposed Action would not be significant. The Proposed Action should have limited short-term effects upstream and downstream of the project during construction, and relatively no effect to flood control subsequent to construction.

Locally high-intensity rainfall events could cause the local washes in the Toquop project area to carry high volumes of runoff for short periods of time. Some of the features of the Proposed Action are located within a Zone D flood area (undetermined flood hazards) as designated by FEMA.

The flooding potential, however, results mainly from flows in the smaller local washes and not from flows in either the Toquop Wash or the South Fork Toquop Wash, the two principal surface water drainage features in the project area. This conclusion is based on the fact that each of these larger washes has cut deep canyons or arroyos within the project area that are anticipated to contain flows that correspond to a maximum 100-year return interval runoff events.

Plant Site

Six small, unnamed washes cross Section 36 where the power plant would be located under the Proposed Action and two of the washes are within or immediately adjacent to the plant site. The specific disturbed area where the plant structures and facilities would be constructed directly straddles one of these washes. That particular wash, therefore, would be filled and its watercourse diverted to one or more adjacent washes. As a result, the amount and rate of flow in the wash(es) that receive(s) the diverted flows would increase when local rainfall events are great enough to generate runoff.

Construction of the power plant would create areas that are impervious (covered by impermeable surfaces such as roofs, roads, parking areas), which would increase the amount and rate of flow of runoff from local storms. The total area rendered impervious would be approximately 15 acres. Assuming that the maximum daily rainfall at the plant site is approximately 3 inches, the corresponding stormwater runoff from the 15 acres of impervious surfaces would be approximately 3.75 acre-feet, or approximately 2 cubic feet per second (cfs) averaged over 24 hours.

Linear Facilities

During both construction and operation, the linear facilities associated with the Proposed Action (such as, access road, water pipeline, and electricity to the wellfield) would not affect the ephemeral washes they cross.

Under the Proposed Action, the utilities (water pipeline and electricity to the wellfield) would be routed across several washes, including the South Fork Toquop Wash, and through the Toquop Gap, which is the watercourse of the main Toquop Wash. Where the utilities cross the various washes, particularly the Toquop and the South Fork, the utilities would be buried sufficiently deep so as not to affect water flow or erosional processes (scouring) in the bottom of these washes.

The access road under the Proposed Action will utilize culverts to channel storm water under the road. These culverts will be sized appropriately according to local requirements. Therefore, the road would experience flooding only during extreme runoff events, and flooding would not constitute an environmental impact.

6. Storm, Wave and Erosion Buffers

Not applicable. The Proposed Action will not interfere with, and was not designed to function as a storm, wave, or erosion buffer.

7. Erosion and Accretion Patterns

Both project construction and operation in the Toquop area provide opportunity to potentially affect the surface water quality of the local washes and, in turn, the Virgin River. Water quality in the washes could be degraded by the addition of both suspended solids

(sediment) and dissolved constituents (substances commonly found in stormwater runoff from parking lots and industrial areas).

During construction, earthmoving activities could increase the potential for erosion from precipitation, which, in turn, would contribute additional suspended solids (sediment load) to the runoff in the local washes. During operation, diverted runoff from the wash filled in to accommodate construction of the power plant could increase the potential for erosion, and, therefore, result in increased sediment loads in the receiving wash(es).

With the implementation of commitments in Appendix B of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*, no impacts to erosion or surface water quality are anticipated from the utilities that link the wellfield to the plant site, or from the development and operation of the wellfield.

8. Aquifer Recharge

Under the Proposed Action, pumping water from the fractured-rock aquifer in the Tule Desert in the amount and rates necessary to serve the proposed project would not result in a substantial decline in ground water levels or a substantial depletion of ground water resources. Water levels within the Tule Desert would be lowered as a result of project pumping, but not to the extent that a substantial depletion of ground water resources would occur.

Outside the Tule Desert, specifically in the Virgin River Valley hydrographic area, ground water levels, as well as the availability of the ground water resources, would remain unchanged as a result of pumping in the Tule Desert.

With respect to the regional carbonate-aquifer system, the rate of ground water extraction for this project would be only a small fraction of the total capacity of the aquifer. Within the Colorado River Basin, the flow has been estimated to be approximately 200,000 afy (see *Section 4.2.1, Ground Water Resource* of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*). The project demand of approximately 7,000 afy is 3.5 percent of that amount. The Nevada State Engineer has approved 2,100 acre-feet of water per year of the Vidler Water Company - Lincoln County water right applications. Vidler Water Company - Lincoln County have an application for additional water allocations adequate to operate the power plant. The application is being held aside pending results of additional hydrologic studies.

9. Baseflow

The washes within the Proposed Action are ephemeral, and normal flows are generally restricted to storm event runoff, thus there is no baseflow. Construction of the Proposed Action, should, therefore, have no impact on the baseflow of the ephemeral washes within the project area.

10. Mixing Zone

(In light of the depth of water at the disposal site; current velocity, direction and variability at the disposal site; degree of turbulence; water column stratification; discharge vessel speed and direction; rate of discharge; dredged material characteristics;

number of discharges per unit of time; and any other relevant factors affecting rates and patterns of mixing.)

The ephemeral washes within the Proposed Action are normally dry. All discharges of dredged and/or fill material would occur when there is no flow in the washes so there would be no mixing effects to consider.

All construction activities would be completed in dry riverbeds. Construction would cease during flow events within the washes, and all equipment would be removed from within the ordinary high water mark (OHWM) until flows subside. Any other discharge of fill material that would occur is expected to be minimal.

B. Anticipated Changes to the Biological Characteristics of the Aquatic Environment

1. Special Aquatic Sites (Wetlands, Mudflats, Coral Reefs, Pool and Riffle Areas, Vegetated Shallows, Sanctuaries and Refuges, Defined In 40 CFR 230.40-45)

No special aquatic sites are present within the Proposed Action.

2. Habitat for Fish and other Aquatic Organisms

No perennial water exists within the Proposed Action to support fish or other aquatic organisms.

The Proposed Action would not adversely effect any fish habitat and would have only a very minimal, if any, effect on other aquatic organisms. Because the surface waters within the Proposed Action are ephemeral, fish are not expected to be present. A limited group of aquatic organisms are capable of utilizing the ephemeral surface water when it is present. The Proposed Action would not affect these organism's use of the post-construction ephemeral water flows above or below the project area.

3. Wildlife Habitat (Breeding, Cover, Food, Travel, General)

Direct and indirect impacts on wildlife and wildlife habitat would result from implementing the Proposed Action. Direct impacts would result from ground disturbance during construction-related activities and project operation and maintenance that would total 449 acres. Following reclamation, the net new long-term disturbance would be 182 acres. Direct impacts would also occur from vehicle-wildlife conflicts during construction and operation. Desert bighorn sheep may be impacted by increased traffic on that portion of the access road between the proposed plant site and I-15 where it passes through a portion of the East Mormon foothills. Indirect impacts would result from increased public access and project maintenance. Habitat loss through the loss of vegetative cover would have an adverse effect on wildlife species dependent on vegetation for food or cover. In general, impacts on wildlife and wildlife habitat would be the same as those described in detail in *Section 4.5.1* of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* for threatened, endangered, and sensitive species of plants and wildlife.

Impacts on reptiles and small mammals would occur as a result of the ground disturbance associated with project construction, operation, and maintenance. Direct impacts to reptiles

and small mammal species would include mortalities from construction activity and vehicular traffic. Reptile habitat would be destroyed as a result of earth moving activities, and direct mortalities may result from reptiles being crushed underground or run over by earth moving equipment. Some wildlife species would be temporarily displaced during construction activities.

During construction, dust and other construction-related disturbances may affect plants and wildlife. Construction may possibly fragment existing habitat use patterns, leading to a reduction in quality of habitat adjacent to new construction.

No direct or indirect impacts on aquatic habitat and fisheries of the Virgin River would result from ground water pumping for the Proposed Action. No short-term, adverse impacts from ground water pumping on the availability of water to wildlife are anticipated.

The evaporation pond for the Toquop power plant would be located in an area with few water sources. Especially because of this isolation, it may attract waterfowl, shorebirds, and other waterbirds, thereby creating possible exposures of birds to highly saline water at the power plant. The ions in the pond water (e.g., Na+, K+, Cl-, and SO4-) are generally non-toxic and are not considered problematic to wildlife at normal environmental levels. However, concentrations of sodium (147,963 ppm) expected in the evaporation pond far exceed those associated with adverse effects in waterfowl; therefore, risk of mortality in waterfowl utilizing the pond is likely. For example, sodium concentrations are more than ten times the levels that reduced growth or survival of mallard ducklings, and nearly ten times the levels associated with a die-off of adult waterfowl in North Dakota when fresh water was unavailable. Similarly, the expected sodium concentration is almost twice that found in process pond waters at an industrial site on Searles dry lake bed in California where dehydration (from lack of a freshwater source) or sodium toxicity caused bird mortality. Sodium toxicosis was also observed in ruddy ducks utilizing agricultural evaporation ponds in California that had sodium concentrations about one-fourth of those estimated for the Toquop evaporation pond.

High levels of salinity, especially when coupled with low ambient temperatures (<4° C), can result in salt encrustation on the feathers of waterfowl and other waterbirds. This encrustation of salt on the feathers results in the inability of the birds to fly to freshwater sources or continue migration, which may result in their death (possibly by drowning). Salt encrustation on waterfowl feathers and mortality were observed in several field studies (including those mentioned above) and in another hypersaline wetland with electrical conductivity lower than that estimated for the evaporation pond. Appendix E, Salinity Effects on Birds, provides additional detail on the expected chemical make-up of water in the evaporation pond and possible effects on birds. (See Section 4.5.4.1.2 in the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* regarding mitigation of potential pond impacts on waterfowl.)

The Toquop area, and the Pah Rah parcel described below, are both mostly undisturbed, but support very different plant and wildlife communities. Both support wildlife habitat of value to Nevada and the nation.

4. Endangered or Threatened Species

a. Listed Endangered and/or Threatened Species or Designated Critical Habitat Present on Site

Direct impacts (effects) on threatened, endangered, and sensitive species can result from ground disturbance caused by construction-related activities and project operation and maintenance. Indirect impacts can result from increased public access and project maintenance. Ground disturbance impacts vegetation by habitat destruction and degradation resulting from soil compaction and vegetation removal, and by erosion when vegetation is lost. The loss of vegetative cover can adversely affect sensitive wildlife species dependent on vegetation for food or cover. Impacts can occur as a result of construction, operation, and maintenance of the power plant and associated facilities.

Ground disturbance can also have a more permanent impact because of the take of wildlife species. Wildlife can be adversely impacted by increased human activity that causes wildlife harassment, legal and non-legal take of wildlife species, take from vehicles on roads or increased off-road use, and general disturbance of wildlife. Long-term impacts can occur from loss of vegetation and wildlife habitat resulting from the slow process of revegetation in disturbed areas, because of erosion, or continued disturbance from maintenance.

Desert Tortoise. Table 4-1 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* lists acres of desert tortoise designated critical habitat and desert tortoise habitat not designated as critical that would be temporarily or permanently disturbed under the Proposed Action and Alternatives 1, 2, an 3. Direct impacts on desert tortoise habitat would result from ground disturbing construction activities. Project features and construction rights-of-way associated with the Proposed Action would be located on approximately 449 acres of desert tortoise habitat, 222 acres of which have been designated as critical habitat. Assuming an average density of approximately 11 desert tortoises per square mile (640 acres) in the general area (see Affected Environment discussions in *Section 3.5.1, Threatened, Endangered, and Sensitive Species* of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*), 449 acres would provide habitat for 8 desert tortoises. The net new long-term disturbance of 182 acres, following reclamation of disturbed sites (see Table 4-1), would provide habitat for three desert tortoises. The resultant short-term and long-term loss of vegetation would reduce the amount of forage available to tortoises. Activities associated with project construction could potentially injure or kill tortoises. Vehicles and heavy construction equipment pose the greatest hazard to tortoises and their burrows. Tortoise fencing installed along the access road under the Proposed Action would minimize or eliminate the potential for highway-related mortality (see below and *Appendix A, Measures for Protecting Desert Tortoises and Their Habitat,* of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project,* for a discussion of this and other desert tortoise mitigation measures). This access road would pass through the Mormon Mesa ACEC and desert tortoise critical habitat.

Indirect impacts on tortoises could result from increases in human activity during construction, operation, and maintenance. Impacts from increased human activity could include further habitat disturbance from recreational OHV activity, direct mortality from off-road vehicles crushing tortoises, increased illegal collecting of tortoises, and mortality from vandalism (for example, shooting). Mitigation measures, particularly fencing

requirements, would be effective in reducing potential impacts from traffic on the access road to the plant site. With tortoise undercrossings provided at intervals of not greater than 1 mile on the access road, habitat fragmentation resulting from road improvements would not be a concern. Potential impacts from maintenance of the water pipeline would be greatly reduced through worker education measures.

Southwestern Willow Flycatcher, Yuma Clapper Rail, Woundfin, and Virgin River Chub. Implementing the Proposed Action would have no direct or indirect impact on riparian or aquatic habitats of the Virgin River on which these species depend.

No mitigation is proposed; however, the project includes measures to protect desert tortoise and their habitat (see Appendix A of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*). Measures have been established in the Approved Caliente Management Framework Plan Amendment (APA) and Record of Decision (ROD) for the Management of Desert Tortoise Habitat (BLM, 2000) and are applicable to this proposed project. These measures include the Terms and Conditions to implement the Reasonable and Prudent Measures in the US Fish and Wildlife Service's (FWS) Biological Opinion (BO) for the APA (FWS, 2000). Of the eight Reasonable and Prudent Measures implemented to reduce the take of desert tortoises and their habitat, Numbers 5, 6, and 7 are applicable to this project. Also included are the Standard Operating Procedures (SOP) that were issued by BLM to aid in the recovery of the desert tortoise. These measures are consistent with those developed for the Clark County Multiple Species HCP and EIS (Clark County, 2000). For the Toquop Energy Project, permanent tortoise-proof fencing will be required for the access road from I-15 to the plant because the road is within an ACEC. Measures to protect desert tortoise, in addition to those commitments contained in Appendix A, may be further developed during formal consultation with the FWS under Section 7 of the ESA and stipulated in the BO for this project.

b. Proposed Listed Endangered and/or Threatened Species or Proposed Critical Habitat Present on Site

The Gila monster and chuckwalla likely occur in the project area, particularly in areas with rocky outcrops. Both species would be subjected to the same impacts described for desert tortoises. Impacts on migratory birds identified in *Section 3.5.1, Threatened, Endangered, and Sensitive Species* of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*, including the Fish and Wildlife Service candidate species, the yellow-billed cuckoo, would be avoided as long as nests are not disturbed during the breeding season. No significant bat roosts are known to occur within or adjacent to the construction zones and, therefore, no impacts are anticipated.

Appendix B, Standard Construction and Operation Procedures, of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*, contains measures to prevent or minimize the potential for impacts on other special status species. Examples include consideration of bird breeding seasons, burrowing owls, bat roosts (if encountered), Gila monsters, and chuckwallas.

c. Compliance with ESA - Formal/Informal Consultation or Conference

A biological Assessment has been submitted. No Biological Opinion has been issued.

5. Biological Availability of Possible Contaminants in Dredged or Fill Material, Considering Hydrography in Relation to Known or Anticipated Sources of Contaminants; Results of Previous Testing of Material from the Vicinity of the Project; Known Significant Sources of Persistent Pesticides from Land Runoff or Percolation; Spill Records for Petroleum Products or Designated (Section 311 of the CWA) Hazardous Substances; other Public Records of Significant Introduction of Contaminants from Industries, Municipalities or other Sources

The project proponent is not aware of any possible contaminants that the proposed activity would make more biologically available.

6. General Environmental Concerns

C. Anticipated Changes to the Human Use Characteristics of the Aquatic Environment

1. Existing and Potential Water Supplies; Water Conservation

Section 4.4 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* evaluates the potential impacts associated with pumping ground water from the Tule Desert to supply up to 7,000 acre-feet of water per year (afy) for 42 years to the proposed project. These impacts not only include the potential project-induced effects on ground water resources, but also the potential project-induced effects on other water resources (springs and surface water bodies).

Pumping water from the fractured-rock aquifer in the Tule Desert in the amount and rates necessary to serve the proposed project would not result in a substantial decline in ground water levels or a substantial depletion of ground water resources. Water levels within the Tule Desert would be lowered as a result of project pumping, but not to the extent that a substantial depletion of ground water resources would occur.

Outside the Tule Desert, specifically in the Virgin River Valley hydrographic area, ground water levels, as well as the availability of the ground water resources, would remain unchanged as a result of pumping in the Tule Desert.

Specifically, based on the results of an analysis of potential water level decline (drawdown) presented in CH2M HILL (2002), ground water levels will be lowered within the Tule Desert a minimum of approximately 45 feet within a radius of approximately 1,000 feet from a representative production well (pumping at a rate of 1,100 gallons per minute [gpm]) under the conditions determined from the local aquifer testing (see *Section 3.4.2.1.2, Ground Water in the Fractured Rock*). The maximum drawdown would remain above the top of the fractured-rock aquifer and no de-watering of the aquifer would occur.

The same representative well would drawdown the water level 0.5 foot at a distance of roughly 1.5 miles from the well. Beyond 1.5 miles from a representative well, the drawdown would be less than 0.5 foot. Accordingly, project pumping would not result in a substantial water-level decline outside of the Tule Desert because the wellfield would be designed such that the wells would be: 1) spaced to minimize additive effects on drawdown; and 2) located at least 1.5 miles from the edge of the Virgin River Valley hydrographic area.

These results occur largely because of the steep lateral hydraulic gradient in the Tule Desert fractured-rock aquifer (discussed in *Section 3.4.2.1.2, Ground Water in the Fractured Rock.* The

steep gradient is indicative of the relatively poor ability of the Tule Desert fractured-rock aquifer to transmit ground water (low tranmissivity), which acts to limit the lateral extent of water level decline around a pumping well (that is, the lower the transmissivity, the smaller the radius of influence around a well). In addition, the steep gradient means that most of the water entering the project wells would do so from the upgradient direction (from the north in the Tule Desert), causing water level declines to be less over a similar distance south of the production wells toward the downgradient Virgin River Valley.

Although the water levels will be lowered in the vicinity of each production well, there would be no major dewatering of the fractured rock aquifer or depletion of the ground water resource within the Tule Desert. The amount of annual ground water flow through a 4-mile wide portion of the basin within the fractured-rock aquifer has been estimated to be slightly less (6,500 afy) than the amount of water required for the project (up to 7,000 afy). Additional ground water also flows within the Tule Desert outside this 4-mile width and at depths greater than investigated to date.

As long as the fractured-rock aquifer is not de-watered (that is, the water level does not decline below the top of the fractured rock), the lower water levels correspond to a localized decrease in the pressure exerted by the water in the fractures, and do not represent a major loss of water from storage. This occurs because the aquifer is confined under pressure, and would continue to be confined during project pumping as long as the fractured rock remains fully saturated.

In the Tule Desert basin-fill deposits, the actual extent of the water level decline that would be caused by project pumping is unknown because of the aquifer complexity and the limited available data. However, the amount of ground water level decline in the basin-fill would be no greater than that anticipated for the fractured rock, and most likely considerable less based on the understanding that the ability of the basin-fill deposits to transmit water (aquifer transmissivity) is very low and because ground water in the basin fill is assumed to be unconfined (see *Section 3.4.2.1.1, Ground Water in the Basin Fill* and CH2M HILL, 2002). For the purpose of this impacts assessment, the water level decline is conservatively assumed to be the same in the basin fill as it is in the fractured rock. Accordingly, there would not be a substantial water-level decline in the basin fill material outside of the Tule Desert.

The only known current water well that taps basin-fill ground water in the Tule Desert is the Tule Well, which is capable of pumping approximately 8 gpm on demand. Given the distance of this well from the area where the project wells are likely to be located (that is, it is located more than 1.5 miles from where a project well would be located), together with the small well yield and water demand associated with this well, it is unlikely that this well would be adversely affected by project pumping.

There are no current users of ground water from the fractured-rock aquifer in the Tule Desert. Consequently, no existing wells would be affected by the water level decline that would occur in the fractured-rock aquifer within the Tule Desert.

Because ground water in Virgin River Valley is a vital source of water to municipalities and agriculture in the region, the potential impacts of project pumping on this resource must be assessed thoroughly. Therefore, in addition to the drawdown analysis, presented above,

which indicates that water level declines will be restricted to roughly 1.5 miles from the pumping wells, the conclusion that project pumping would not result in either substantial ground water level declines or a substantial loss of the ground water resource within the Virgin River Valley is further supported by the following factors:

- As presented in *Section 3.4.2.2.3, Aquifer Characteristics, of the Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project,* the available perennial yield in the lower Virgin River Valley is estimated by Dixon and Katzer (2002) to be approximately 40,000 afy, even after the current local pumping in the Virgin River Valley, reported to be about 12,000 afy, is taken into account. This estimate implies that even if the entire project demand were to be pumped directly from the lower Virgin River Valley, there would still be 33,000 afy of perennial yield available within the Virgin River Valley.

- The volume of ground water in storage in the uppermost 100 feet of saturated sediments in the Virgin River Valley is estimated to be close to 3 million acre-feet. This volume is more than 10 times the entire 42-year water demand of the project. A vast amount of ground water is, therefore, stored within the Virgin River Valley. Even in the absence of available perennial yield, this much water in storage effectively mitigates the extent of water level decline caused by local pumping. Consequently, even if the entire project demand were pumped directly from the Virgin River Valley, and not from the proposed location in the Tule Desert, the resulting water level decline in the Virgin River Valley could be controlled through the wellfield design such that no existing wells would be adversely affected. In other words, through optimizing the spacing of the wells, the water level decline associated with pumping 7,000 afy could be kept at levels that would not affect the water levels in existing production wells within the Virgin River Valley).

  This conclusion is further supported by the results of two different analyses, the first being the results of the Tule Desert drawdown analysis discussed above. The Muddy Creek Formation is understood to be no more transmissive than the fractured-rock aquifer of the Tule Desert. Accordingly, a similar limited area of influence of a given pumping well in the Tule Desert should also occur in the Muddy Creek Formation (that is, drawdowns of no more than approximately half a foot at distances of roughly 1.5 miles from the pumping well).

  Second, the results of a study of spatially concentrated pumping 10,000 afy from the Muddy Creek Formation in the vicinity of Halfway Wash indicates that drawdowns on the order of 5 feet extend no more than 6 miles from the pumping center after 50 years (Las Valley Water District, 1992).

- Based on the generally southern direction of the hydraulic gradient of ground water in the Tule Desert fractured-rock, ground water inflow from the wellfield portion of Tule Desert into the Virgin River Valley occurs primarily west of Toquop Wash and downgradient of the current municipal production wells that serve the towns of Mesquite and Bunkerville. This implies that ground water intercepted by the project wells in the Tule Desert would not flow, in the absence of project pumping, toward existing Virgin River Valley wells. Project pumping, therefore, would not affect ground

water flowing to existing Virgin River Valley wells, and water levels in these wells would similarly not be affected by the proposed project.

- A comparison of the C-14 data from the fractured-rock aquifer in the Tule Desert (PW-1) with the available data from municipal wells in the Virgin River Valley (Bunkerville 1 and 2, and Virgin Valley 5 and 25) clearly indicate that age of the ground water is significantly different between these two areas—implying a different source for each water type. Pumping in the Tule Desert, therefore, would not affect the existing municipal wells in the Virgin River Valley because they have independent sources.

  Specifically, the value of C-14 at PW-1 (0.9 percent modern carbon) approaches the maximum age for using C-14 for dating purposes (approximately 40,000 to 50,000 years old.

  Carbon-14 data from the municipal production wells in the Virgin River Valley reveal the following two related occurrences: 1) the ground water from the Virgin River Valley wells is younger than the ground water from PW-1 in the Tule Desert; and 2) the age of the ground water from the Virgin River Valley wells increases from east to west (that is, in a downstream direction along the Virgin River). Both of these observations support the occurrence of independent ground water flow paths between the proposed wellfield area in the Tule Desert and the existing municipal wells in the Virgin River Valley. Specifically, they reinforce the conclusions made above that ground water that currently flows beneath the Tule Desert enters the Virgin River Valley downstream of the Virgin Valley municipal wells.

With respect to the regional carbonate-aquifer system, the rate of ground water extraction for this project would be only a small fraction of the total capacity of the aquifer. Within the Colorado River Basin, the flow has been estimated to be approximately 200,000 afy. The project demand of approximately 7,000 afy is 3.5 percent of that amount. The Nevada State Engineer has approved 2,100 acre-feet of water per year of the Vidler Water Company—Lincoln County water right applications. Vidler Water Company—Lincoln County have an application for additional water adequate to operate the power plant. The application is being held aside pending results of additional hydrologic studies.

2. Commercial or Recreational Fisheries

No perennial water occurs within the Proposed Action to support a recreational or commercial fishery.

3. Other Water Related Recreation

No water-related recreational activities occur within the Proposed Action.

4. Aesthetics of the Aquatic Ecosystem

With the exception of Toquop Wash within Toquop Gap, the aesthetic value of the waters of the US within the Proposed Action is limited. All of the ephemeral washes within the Proposed Action, except for Toquop Wash, have little vegetation. Impacts to the stands of riparian vegetation within Toquop Wash can be minimized by refinements of the alignment during the final design of the pipeline, thus minimizing aesthetic affects.

No wetlands are present in the proposed project area.

5. Parks, National and Historic Monuments, National Seashores, Wild and Scenic Rivers, Wilderness Areas, Research Sites, Etc.

Because the Toquop parcels are not within designated Wilderness Areas, Wilderness Study Areas (WSAs), ACEC, or along a Wild and Scenic River, no impacts would occur. The potential wellfield abuts the Mormon Mountains WSA. Therefore, management prescriptions for those special management areas would not apply to any of the proposed project features, except for the proposed access road between I-15 and the southern Toquop parcel, which would cross the Mormon Mesa ACEC.

The proposed access road is an existing dirt road and would require improvement to construct and operate the Proposed Action in both the Lincoln and Clark County portions. Improvements would include road widening to 24 feet, straightening in certain locations, and paving the entire 14.4-mile length of the road. This would potentially affect 216 acres (137 acres in Lincoln County and 79 acres in Clark County) of previously undisturbed lands contained in the construction right-of-way and 20 acres of staging areas in Lincoln County. All of the staging areas and the Clark County portion of the access road are in the Mormon Mesa ACEC, while 123 acres of the previously undisturbed 137 acres in Lincoln County are in the Mormon Mesa ACEC. Following reclamation, the net new long-term disturbance would be 65 acres (42 acres in Lincoln County and 23 acres in Clark County). This ACEC is a desert tortoise Special Management Area (SMA).

The ACEC is a ROW avoidance area in both Lincoln and Clark Counties. However, this is an upgrade to an existing road and will meet ACEC requirements in Lincoln County according to stipulations contained in the Caliente Management Framework Plan that call for the use of existing roads for construction in ACECs and the avoidance of areas outside of corridors within ACECs. The project would also conform with the Las Vegas Resource Management Plan (RMP) as follows: RW-1-e identifies desert tortoise ACECs as right-of-way avoidance areas. Therefore, ACI a/2a applies to any new or change to an existing RW and states "Manage each area based on the specific resource constraints identified in Tables 2-2 through 2-6." Table 2-2 is specifically directed at resource constraints for the desert tortoise ACECs covered by the Las Vegas RMP, which include the Mormon Mesa ACEC. Table 2-2 states that the following resource constraints apply to roads in ACECs: "Require reclamation of temporary roads. Authorize new roads in response to specific proposed actions where no feasible alternative exists. Ensure access to private property." Therefore, the improvement of the existing graveled access road to the proposed power plant site would be in conformance with the Las Vegas RMP, provided all resource constraints are enforced.

6. Traffic/Transportation Patterns

The Proposed Action project area is currently accessible to the public. With the exception of the energy plant site itself, areas currently accessible to the public will remain so. No new roads will be constructed outside of the Proposed Action. The access road into the site will be improved to facilitate construction of the energy facility and access for operation. Significant changes to traffic patterns are not anticipated.

7. Energy Consumption or Generation

The Western Systems Coordinating Council (WSCC) estimates a demand for approximately 11,300 MW of new power plant generation to be constructed in its region of the western United States over the next 10 years to maintain reliable operation of the transmission system. The Toquop project would provide much needed support to the overall energy supply in this region and contribute approximately 10 percent of the projected demand for new generation within the WSCC. Based on data available from the WSCC, the 2002 Operating Reserve Margin (the difference between available capacity, excluding transfers, and peak demand) for the Las Vegas area and the Arizona-New Mexico-Southern Nevada area is minus 2.9 percent. This indicates that the area relies on importing electricity to meet peak demands. This situation is the result of growth in the demand for electricity to serve a fast growing region. The proposed project would significantly strengthen the electric grid in the Las Vegas area, including the City of Mesquite, based on the flow of electric power on the existing transmission system.

8. Navigation

Not applicable. The ephemeral washes within the Proposed Action are usually dry and therefore not used for navigation.

9. Safety

The Proposed Action would not adversely impact safety of the general public or construction personnel. Construction would have to comply with applicable federal, state, and local safety standards. These safety standards would protect the general public that may access the project area during construction and the construction personnel would work on this project. After construction, the proposed project would not create any ongoing safety problem.

10. Air Quality

Section 4.6.1, Air Quality, of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project,* presents a detailed evaluation of the Proposed Action's impacts to Air Quality. This evaluation is summarized below.

Construction Impacts

Various control measures would be used to minimize impact of construction-related emissions. Because of these measures to prevent fugitive dust and the minimum vehicle emissions, the potential impacts resulting from construction activities at the proposed site would occur only over a limited geographic area and only for a limited time. After site preparation is complete, foundations have been constructed, and mitigation measures such as covering of traffic routes with gravel have been implemented, emissions would be very low. A Class II analysis, using the SCREEN3 dispersion model, demonstrates that federal and state ambient air quality standards would not be exceeded at any time during the construction phase. All predicted construction impacts are less than allowable standards.

Operational Impacts

To assess potential air quality impacts associated with operation of the facility, dispersion modeling was performed using EPA-approved air quality dispersion models, which are mathematical descriptions of atmospheric diffusion and dispersion processes that can be

used to predict pollutant impacts over a given area. The modeling was conducted in accordance with a dispersion modeling protocol that was submitted to and approved by the NDEP BAQ as part of the PSD process. *Appendix E, Air Quality Dispersion Modeling Methodology,* of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project,* describes the air quality dispersion modeling methodology in detail.

Dispersion modeling of the maximum allowable emissions from the Toquop facility was performed for NOX, CO, PM10, and SO2. No EPA-approved models exist for prediction of ozone impacts of a single facility.

Predicted impacts are compared to the "PSD Increment," which is the maximum allowable ambient air quality deterioration allowed under the PSD program. They are also compared to the national ambient air quality standards (NAAQS). The NAAQS are the pollutant concentrations below which, as determined by the USEPA, no adverse human health or environmental impacts are presumed to occur. Nevada has specific state AAQS, but these generally match the federal standards.

Ambient impacts of hazardous air pollutant (HAP) emissions were estimated by prorating the ISCST3 and CTSCREEN modeling results for the criteria pollutants based on the ratios of HAP emission rate to criteria emission rate for each pollutant and each source. None of the estimated HAP concentrations exceed the available standards, based on the appropriate exposure term. Therefore, even if residences were located in close proximity to the site, it is very unlikely that the estimated HAP concentrations would result in an unacceptable risk to the occupants of those residences. The distance of the proposed Toquop facility from any residences or business makes this analysis even more conservative.

Evaluation of air emission impacts on Federal Class I areas is focused on two primary topics. First, maximum ambient concentrations of criteria pollutants are estimated and compared to Class I area ambient air quality standards and Class I area allowable increment. Second, impacts of air emissions on Air Quality Related Values (AQRVs) within the Class I area are determined. In the western United States, AQRV evaluation is typically limited to evaluation of impacts on regional haze and AQRV impacts caused by acid deposition.

A CALPUFF screening model was used to predict impacts on the Grand Canyon National Park. National Weather Service meteorological data from Las Vegas were used for this analysis. This is the nearest existing set of data.

Three additional Class I areas exist within 200 kilometers (125 miles) of the Proposed Action plant site. These are the Sycamore Canyon Wilderness Area, Bryce Canyon National Park, and Zion National Park. Because the distances to these areas are greater than the distance to the Grand Canyon National Park, the managers of these areas suggested that an analysis of potential impacts on the Grand Canyon National Park only would be adequate. Facility impacts on the Grand Canyon National Park should exceed impacts at the other three areas.

All predicted impacts are well below PSD Class I modeling significance levels; therefore, the Proposed Action is presumed to have an insignificant impact on air quality in the area and a cumulative evaluation of the impacts on increment and NAAQS was not performed.

The CALPUFF screening analysis predicted that the reasonable but conservative impact on regional haze within the Grand Canyon National Park was a 3.5 percent change in atmospheric light extinction. In accordance with the FLAG guidance document, a facility predicted to cause a change of 5 percent or less is presumed to have an insignificant impact on visibility. Therefore, a cumulative impact analysis of impacts on the Grand Canyon National Park was not performed. The subsequent complete CALPUFF analysis predicted that the reasonable but conservative impact on regional haze within the Grand Canyon National Park was a 1.6 percent change in atmospheric light extinction.

Reasonable but conservative modeling, based on CALPUFF screening analysis of the Proposed Action impact on acid deposition in the Grand Canyon National Park indicates that the added deposition would not exceed 1.3 x 10-3 kilograms per hectare per year (kg/ha/yr) for nitrogen compounds and 1.3 x 10-3 kg/ha/yr for sulfur. These results are significantly less than the deposition analysis thresholds of 5.0 x 10-3 kg/ha/yr for nitrogen recommended by the 2001 FLAG Guidance on Nitrogen Deposition Analysis Thresholds document and 5.0x10-3 kg/ha/yr for sulfur, as proposed but not yet finalized by the National Park Service (NPS). Because the estimated impacts of the Proposed Action were extremely low, the Proposed Action is presumed to create an insignificant increase in the total deposition for the Grand Canyon National Park. Therefore, a more complete analysis of existing plus proposed deposition compared to the acid neutralization capacity of the Grand Canyon National Park waters was not performed.

Class II Area Visibility Impacts

The NPS requested an analysis of visibility impacts within the Lake Mead National Recreation Area. This included a CALPUFF analysis of impacts on regional haze and a VISCREEN analysis of discrete plume visibility impacts.

Regional Haze Impacts

The regional haze CALPUFF screening analysis predicted a reasonable but conservative 2.1 percent change in atmospheric light extinction resulting from the Proposed Action. Because this is well below the 5 percent threshold recommended in the FLAG document, no cumulative impact analysis of Lake Mead National Recreation Area regional haze was performed.

Discrete Plume Impacts

The VISCREEN distribution model was used to assess discrete plume impacts. This model assumes all plant emissions would form a single plume. On this basis, the four combustion turbine generator/duct burner stacks and the 16 cooling tower cells of the Proposed Action were modeled as a single plume blowing straight towards Lake Mead.

For the Proposed Action, based on the Las Vegas meteorological data set used for the CALPUFF analysis, this reasonable but conservative meteorology was determined to be a "D" class stability and a 4 m/s windspeed. These data were used for the VISCREEN analysis. No published standards exist for evaluation of discrete plume visual impacts in federal Class II areas. For federal Class I areas, the VISCREEN users' manual suggests maximum allowable color contrast ("delta E") of 2.0 for results viewed against terrain or sky, maximum allowable contrast of 0.5 for results viewed against sky, and maximum allowable contrast of 0.6 for results viewed against terrain.

For the Proposed Action, the model predicts that the reasonable but conservative color contrast and contrast, viewed against sky, would be 0.25 and -0.008, respectively, for situations where the observer is viewing the plume with the sun behind the observer, and 1.5 and 0.031, respectively, for situations where the observer is viewing the plume with the sun behind the plume. These results are well within the standards for Class I areas. The model predicts reasonable but conservative color contrast and contrast, viewed against terrain, of 0.083 and 0.01, respectively, with the sun behind the observer, and 2.3 and 0.015, respectively, with the sun behind the plume.

The model predicts that, under the right atmospheric conditions and with specific relative angles between the observer, the plume, and the sun, the total Proposed Action plant emissions merging to form a single plume could be viewed against terrain at Lake Mead National Recreation Area. Predicted results are well within Class I area standards for all other situations.

These conditions could occur, at most, for 1 percent of the year. Less than 1 percent of the Lake Mead National Recreation Area is within the radius where these results were predicted. Furthermore, at the specified angles of sun, observer, and terrain, no elevated terrain against which the observer could view the plume exists. Therefore, VISCREEN predicts minimal impact on visibility within the Lake Mead National Recreation Area.

11. Noise

Construction of the Proposed Action would result in a temporary (26-month) direct increase in ambient noise levels at the southern Toquop power plant site, along the access road to the site, at the wellfield, and along the western water pipeline alignment. The actual increase in ambient noise levels at any given location would depend on the construction activity occurring and the number and mix of construction vehicles and equipment in use.

Construction of a power plant can generally be divided into five phases that use different types of construction equipment. The five phases are: 1) site preparation and excavation; 2) concrete pouring; 3) steel erection; 4) mechanical; and 5) clean-up. Construction equipment generates both constant and impulse noise, depending on the type of equipment. Noise levels generated by construction equipment generally range from 85 to 98 dBA at 50 feet, and would vary, depending on the construction activity. Some blasting is anticipated during construction. The increased noise level (approximately 105 dBA at a distance of 1,000 feet) would have a duration of less than 2 seconds. These construction noise levels would be temporary, and noise levels at the source would not exceed 110 dBA. No sensitive receptors would be exposed to the noise. Lincoln County's Zoning Ordinance does not include a noise ordinance (Lincoln County, 2001b).

Operation of the proposed power plant is expected to emit noise levels of approximately 60 dBA at approximately 550 feet over open land. No noise ordinances exist in Lincoln County, and no sensitive receptors would be exposed to the noise.

12. Historic Properties

Surface evaluation of the Proposed Action resulted in no paleontological resources.

Ten archaeological sites (eight prehistoric, two historic) and two isolated artifacts could be affected by construction or by change of ownership resulting from the proposed land

exchange. All of these cultural resources are ineligible for the National Register of Historic Places (NRHP). Indirect impacts could potentially result from greater human activity in the area and possibly increased OHV use.

The BLM initiated consultation with several Southern Paiute tribes concerning both the initial land exchange proposal as well as the ensuing Toquop Energy Project. Several responding tribes made a site visit, and concerns were raised about possible effects to the Salt Song Trail, a property of traditional cultural or religious importance. Subsequently, among those tribes expressing initial concerns, one tribe indicated that this property does not extend into the project area, and another tribe indicated it has no concerns with the Proposed Action or its alternatives. Otherwise, BLM determined it had not received enough information about this property's location or its current use to assess possible project-related effects in relation to expressed concerns. No tribe has responded to BLM's request for more specific information about this property's location or possible effects on religious practitioners. Additional information on consultation is provided in *Section 5.3.2, Native American Consultation,* of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project.*

No special consideration is necessary for ineligible cultural resources sites or isolated artifacts. The Proposed Action can therefore proceed with no requirements for avoidance or mitigation of historic properties.

The potential exists for buried cultural resources not visible on the surface survey, although the geomorphic context of the Proposed Action makes the presence of any such sites unlikely. This low probability of buried deposits precludes the need of archaeological monitors during construction.

Because only a records review has been conducted for the wellfield area, all well locations and associated new access routes must be subjected to a Class III survey prior to any construction, in accordance with terms of the Cultural Resources Programmatic Agreement (PA).

The PA provides specific procedures for handling discoveries during construction. The BLM will ensure that any human remains, grave goods, items of cultural patrimony, and sacred objects encountered during the undertaking are treated with the respect due such materials. In accordance with the terms of the PA, human remains and associated grave goods found on public land will be handled according to the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations (43 CFR 10).

13. Land Use Classification

The Proposed Action would not change land use classification.

14. Economics

Economic Impacts of Construction

The total estimated construction cost of the Proposed Action is approximately $695 million, of which $175 million would remain in the region of influence. The total annual estimated labor cost during construction is $34 million, all of which would be spent within the region

of influence. This construction labor estimate was provided by Toquop Energy and is based on the company's experience with similar projects.

Construction workers would be hired primarily from the local labor force. This includes workers from the Las Vegas metropolitan area; Mesquite and Overton, Nevada; and St. George, Utah. These workers are expected to commute daily to the project construction site. It is recognized that some construction workers may arrange for temporary residency (in rental homes or at recreational vehicle [RV] parks) in the Mesquite, Nevada, or the St. George, Utah, areas, which are relatively close to the project site. However, it is expected that the majority of construction workers would not choose to do so.

According to Toquop Energy, the Proposed Action would generate peak and average construction employment levels of 950 and 500 workers, respectively, in the combined Lincoln and Clark County area. Project construction is expected to last 26 months, and annual construction payroll is estimated at $34 million. Although the unemployment rate in the region is not exceptionally high (the 2001 average was 7.2 percent in Lincoln County and 5.5 percent for Clark County), construction workers are expected to be hired from the local labor force. Thus, most construction workers would not relocate from other areas in the state or the country. Workers with specialized skills may be imported from other areas; however, this number is expected to be low when compared to the total number of construction workers required for construction of the Proposed Action.

Assuming an average annual direct construction employment level of 500 jobs, the resulting total employment generated would be about 875 jobs. This estimate is derived from the Type Social Accounting Matrix (SAM) employment multiplier of 1.75 for IMPLAN Sector 50: New Utility construction. The 875 jobs is the sum of the direct employment (500 jobs) and the indirect and induced employment of approximately 175 and 200 jobs, respectively. Indirect employment refers to the employment that is generated by the goods and services provided to construct and operate the Proposed Action. Induced employment refers to the employment generated by household spending, and includes the goods and services purchased by employees of the project.

Employment effects during the construction phase would be short-term because the jobs created would only last during the construction period. Although the effect of project construction on regional employment would be beneficial, it would increase employment in the region by less than 0.5 percent.

Earnings and Income

Toquop Energy has indicated that the construction of the Proposed Action, including the power plant, access road, and water pipeline would result in an annual construction payroll of $34 million. The combined Lincoln and Clark County region Type SAM labor income multiplier for IMPLAN Sector 50: New Utility Construction is 1.46, therefore, the construction activities would generate an additional $16 million in indirect and induced labor income within the two- county region. The indirect and induced earnings were estimated to be approximately $8 million each. Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, earnings and income in other areas are not expected to change.

Income that would be generated during the construction phase is considered short-term because the additional income to the region would only last during the construction period. The total income effect of $50 million resulting from project construction would be beneficial, but not substantial, when compared to the two-county regional total personal income of $29 billion.

Tax Receipts

Lincoln County would collect sales and use tax on all real property purchased and delivered to the project site at a combined rate of 6.75 percent (2 percent sales tax, 2.25 percent local school support tax, 0.5 percent basic city-county relief tax, 1.75 percent supplemental city-county relief tax, and 0.25 percent infrastructure). The construction cost of the Proposed Action is estimated at approximately $695 million, of which approximately $70 million would be construction payroll. Assuming 75 percent of the remaining construction cost is for goods and materials, sales and use taxes in the range of $32 million would be generated from an estimated increase in taxable sales of about $470 million.

Housing

It is expected that the labor supply in the Clark/Lincoln County area is large enough that construction workers would not need to relocate from outside the area to construct the Proposed Action. If specialized labor is required that cannot be obtained in Clark County or Lincoln County, the number of people expected to move to the Clark/Lincoln County area from other areas is expected to be low. Housing vacancy rates are about 8.5 percent for Clark County and 29.3 percent for Lincoln County based on the 2000 Census. Because it is likely that most construction workers would be local residents, demand for housing is not expected to change as a result of project construction, and the housing vacancy rate would not be affected.

If construction workers choose to reside in RV parks in Mesquite or Overton, Nevada, nine RV parks with approximately 800 RV sites are available. If they choose to reside in RV parks in the St. George, Utah, area, six RV parks with 920 sites are available. Therefore, an adequate number of RV spaces is expected to be available to construction workers during project construction.

Economic Impacts of Operation

Operation of the Proposed Action would result in indirect and induced economic impacts that would occur within the region of influence. These indirect and induced impacts represent permanent increases in the region's economy. The indirect and induced impacts would result from annual expenditures on payroll as well as those on operations and maintenance.

The total estimated annual operation cost of the Proposed Action is $15.5 million, of which $13 million is the fixed annual operating cost and $2.5 million is annual payroll. All of these costs are expected to remain in the region of influence.

Population

Changes in the Clark/Lincoln County population as a result of operating the Proposed Action are not expected to occur from employment opportunities generated by the project. The operation workforce is very low (estimated at 25) and is expected to be hired from the local area.

Employment

The Proposed Action operational workforce is estimated to be 25. Operational personnel are expected to be hired from the local (Clark County and Lincoln County) workforce unless specialized expertise is required and the workers with specialized skills cannot be hired from the local area.

The 25 new jobs associated with the Proposed Action are anticipated to generate an additional 25 jobs within the two-county region. This estimate is based on the two-county region Type SAM employment multiplier of 2.03, associated with IMPLAN Sector 443: Electrical Services. Of the additional 25 additional jobs, 10 would be from indirect employment and 15 would be from induced employment. The 10 indirect jobs would be created in other industries as a result of operation of the plant by the 25 employees. The 15 induced jobs would result from the spending of earnings by the 35 people who would be employed at the 25 direct and 10 indirect jobs that would be created.

Employment effects during the operational phase would be permanent because the jobs created would remain throughout the life of the project. Although the 50 total additional jobs generated by the Proposed Action would be beneficial to the regional economy, the effect of project operation on regional employment would be minor relative to the 372,000 total employment reported for the two-county region of influence.

Unemployment

The total estimated number of jobs to be created in the Clark/Lincoln County area by project operation is 50. The creation of these jobs would not change the unemployment rate in the region.

Earnings and Income

Toquop Energy has indicated that the plant operation would have an annual payroll of $2.5 million. Based on this direct increase in labor income, the project operation phase would result in a total increase in labor income within the two-county region of about $3.7 million. This estimate is derived from the IMPLAN sector 433 labor income multiplier of 1.49. The indirect and induced earnings are estimated at approximately $0.6 million each

Income that would be generated during the operational phase is considered permanent because the additional income to the Clark/Lincoln County region would remain throughout the life of the project. The income effect of $3.7 million resulting from project operation would be beneficial, but not substantial, when compared to the $29 billion total personal income level of the two-county region of influence.

Tax Receipts

Lincoln County would collect sales and use tax on all real property purchased and delivered to the project site at a combined rate of 6.75 percent. The annual fixed cost operating budget is anticipated to be approximately $13 million, excluding the cost of natural gas. If the entire annual operating budget represented purchases subject to Lincoln County sales tax, this would represent a substantial increase for Lincoln County, which reported taxable sales of $25.2 million for fiscal year 1999-2000. Of the 6.75 percent combined tax rate, 3 percent is collected and disbursed directly to the collecting county. This would represent an annual payment of approximately $390,000 to Lincoln County, in addition to the county's portion of the revenue generated from the remaining 3.75 percent of the combined tax rate. This

increase in sales tax receipts to Lincoln County would be a benefit. The additional sales tax revenue to Clark County would represent a minor benefit to Clark County.

According to Nevada Revised Statutes, if electricity is sold outside of Lincoln County, the project facilities would be centrally assessed in combination with any of the owners of other Nevada holdings associated with the generation and transmission of electricity (NRS 361.320). The estimated annual property tax attributed to the Proposed Action would be approximately $7 million based on project capital cost ($695 million), the assessment rate (35 percent), and the average property tax rate (3 percent). If the project is centrally assessed, the disbursement of this tax to Lincoln County and Clark County would be governed by rules established by the Nevada Tax Commission and would depend on various factors that are unknown at this time. However, any increase in property taxes that would accrue to Lincoln County would be a benefit because the county's relatively small tax base (the 1999-2000 total property tax collection was projected to be $2.3 million). Additional tax revenues from the Proposed Action to Clark County would be minor, relative to the property taxes collected in Clark County.

As discussed previously, Washoe County's property tax revenues would decrease because of the transfer of the Pah Rah parcel from private ownership to federal (BLM) jurisdiction, and Lincoln County's property tax revenues would increase because of the Toquop parcel (either the southern or northern parcel) being transferred from federal (BLM) jurisdiction to private ownership.

Other Income

Water rights that would be required to supply up to 7,000 acre-feet of water per year from the Tule Desert wellfield necessary to operate the Toquop Energy Project have been jointly applied for by Vidler Water Company, Inc. (a sister company of NLRC) and Lincoln County. Toquop Energy would lease and use these water rights for the 42-year life of the project. Lincoln County's estimated share of the leased water is up to $9 million over the life of the project.

15. Prime and Unique Farmland (7 CFR Part 658)

Not applicable. No prime or unique farmland would be impacted by the Proposed Action.

16. Food and Fiber Production

Not applicable. No food or fiber production facilities and no agricultural lands would be impacted by the Proposed Action.

17. General Water Quality

The proposed activity would not adversely impact water quality.

18. Mineral Needs

Not applicable. No mineral or aggregate extraction, processing or sales would be adversely impacted by the Proposed Action.

19. Consideration of Private Property

No relocation of business or residences would be required for the proposed activity. The Proposed Action would occurs within land that is currently owned by the Bureau of Land Management.

20. Conservation

The proposed activity would not impact any existing plans for resource or habitat conservation.

21. Other

D. Other Anticipated Changes to Non-Jurisdictional Areas that have Been Determined to be Within the Corps' NEPA Scope of Analysis

There are no anticipated changes to non-jurisdictional areas that have been determined to be within the Corps' scope of analysis.

E. Summary of Indirect and Cumulative Effects from the Proposed Permit Action

During construction, dust and other construction-related disturbances may directly and indirectly affect plants and wildlife. Construction may possibly fragment existing habitat use patterns, leading to a reduction in quality of habitat adjacent to new construction.

Minor impacts have previously occurred to the ephemeral washes present within and adjacent to the area of the Proposed Action. These minor impacts are associated with the construction of the roadway and powerlines. No reasonably foreseeable actions, such as development or additional roadway construction, are anticipated to occur within the immediate vicinity of the project area, thus cumulative impacts are not expected.

F. Other Cumulative Effects Not Related to the Proposed Permit Action

1. Occurred On-Site Historically

Minor impacts have previously occurred to the ephemeral washes present within and adjacent to the area of the Proposed Action. These impacts are associated with the existing access road as well as utility line corridors present in the general vicinity.

2. Likely to Occur within the Foreseeable Future

No changes to the site within the foreseeable future were identified.

3. Contextual Relationship between the Proposed Action and (1) and (2) Above

The Proposed Action would not impact the existing use of the site. The project would not change planned development within or adjacent to the project area.

G. Mitigation Proposed by Applicant

1. Avoidance, Minimization, Compensation Sequence

a. Avoidance

Several alternatives to the Proposed Action were evaluated. The No Action Alternative would not meet the project purpose and need. Under Alternative 1, the total length of the water pipeline would be 12.6 miles, or 0.1 mile longer than the more westerly route described for the Proposed Action. This route would require crossing Toquop Wash at a wider point than for the Proposed Action. The proposed alternative pipeline alignment also would affect approximately 54 ephemeral washes, whereas the water pipeline for the Proposed Action would affect approximately 10 ephemeral washes.

Under Alternative 2, the construction of 12.0 miles of buried natural gas pipeline to bring fuel to the site, and 12.0 miles of an overhead electric transmission interconnection to carry net power production to the Navajo-McCullough Electric Transmission Line would be required. Constructing an additional 12.2 miles of access road would be required to reach the plant site under Alternative 2. Under this alternative, the proposed access road would impact approximately 83 ephemeral washes; including Halfway Wash, Toquop Wash and Sam's Camp Wash; that either intersect or parallel the proposed roadway. The proposed utility line would affect approximately 54 ephemeral washes, including Toquop Wash and Sam's Camp Wash. These washes also would be affected by portions of the proposed access road.

The impacts associated with Alternative 3 would be the same as for the Proposed Action.

The Proposed Action has the smallest area of permanent impacts to waters of the United States, and at the same time avoids impacts to the desert tortoise critical habitat present north of the Proposed Action plant site.

b. Minimization

To minimize unavoidable impacts to jurisdictional waters, construction activities with jurisdictional waters will be confined to the smallest area practicable.

The width of the fill within the access road will be limited to the minimum necessary for the crossing of waters of the United States. The access road will not cause more than minimal changes to the hydraulic flow characteristics of the stream, and each crossing will be culverted to allow normal flow during rain events.

Following construction, the proposed pipeline right-of-way will be restored to pre-construction contours. The pipeline alignment within Toquop Gap will be refined during the final engineering design phase to specifically minimize impacts to areas of riparian vegetation within the Gap

Appendix B, Standard Construction and Operation Procedures, of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*, contains measures to prevent or minimize the impacts to waters of the United States.

Construction activities will be conducted in accordance with a Stormwater Pollution Prevention Plan to be prepared for the project. Measures to minimize sedimentation and erosion will include best management practices such as check dams, silt fencing, and straw

bales. The sediment and erosion control measures will be maintained throughout the course of construction. The sediment and erosion control measures will be located to protect downstream areas from construction impacts during periods of water flow in the project area.

Access roads and construction staging areas will be designed to allow normal flows to pass unimpeded. There will be no significant change to the hydraulic conditions of the upstream waters during construction activities.

2. Is Mitigation Used to Reduce any Impact to Below Significance?

No mitigation is proposed.

TABLE 1
Summary of Waters of United States Observed Within the Proposed Action and Alternative 3

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
Waters of United States Present in Immediate Vicinity of Proposed Access Road Between I-15 and Plant Site									
R-1	10	N	Y	36°46.754N	114°13.742W	0.3-0.8	Permanent	0.013	Wash located on west side of road, narrows from 10 feet to 4 feet in width. Approximately 40 feet from road at MP 0.3. At MP 0.9 wash is at edge of road and is 4 feet wide. If impacted on west side area of impact estimated to be 150 feet by 4 feet.
R-2	6	Y	Y	—	—	1.0	Permanent	0.007	Wash arises from roadside drainage, then flows east. Area of impact is approximately 50 feet in length and 6 feet width.
R-3	12	Y	N	36°49.288N	114°17.844W	3.2	Permanent	0.01	Existing single 36-inch culvert. Wash approximately 12 feet wide and potential impact may extend approximately 50 feet on western side of road. In Realignment Area #1.
R-4	4	Y	N	—	—	4.4	Permanent	0.06	Located within Realignment Area #3. Roadway cross section estimated to be 700 feet wide.
R-5	6	Y	N	36°50.220N	114°18.062W	4.5	Permanent	0.006	Existing single 12-inch culvert. Wash approximately 6 feet wide.
R-6	3	Y	N	36°50.311N	114°18.332W	4.7	Permanent	0.003	Existing single 24-inch culvert. Wash approximately 3 feet wide.
R-7	10	Y	N	36°51.445N	114°18.480W	6.0	Permanent	0.01	Single 36-inch culvert. Wash varies from 5 to 10 feet in width.
R-8	2	Y	N	36°51.486N	114°18.445W	6.5	Permanent	0.002	Single 24-inch culvert. Two small 1-foot washes converge.
R-9	10 to 20	N	Y	36°51.486N	114°18.481W	6.5-6.6	None	0	Wash located west of and near base of roadway and parallels road—road could be widened to the east to avoid impacts.

TABLE 1
Summary of Waters of United States Observed Within the Proposed Action and Alternative 3

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
R-10	3	Y	N	36°52.407N	114°17.411W	7.8	Permanent	0.003	Existing culvert, wooden culvert marker 7-7/10. Flows west to wash. In Realignment Area #5.
R-11	20	N	Y	36°52.689N	114°17.072W	8.2	None	0	Wash parallels road on west side. Wash width varies from 15 to 20 feet wide; approximately 10 feet from road. In Realignment Area #5.
R-12	25	Y	N	36°52.840N	114°16.674W	8.7	Permanent	0.03	Existing three 36-inch culverts, wash approximately 25 feet wide. In Realignment Area #5.
R-13	15	Y	N	36°52.905N	114°16.657W	8.8	Permanent	0.02	Two 36-inch culverts, wash approximately 15 feet wide. In Realignment Area #5.
R-14	4	Y	N	36°53.097N	114°16.285W	9.2	Permanent	0.004	Existing 24-inch culvert, wooden culvert marker 9-1/10. Wash approximately 4 feet wide.
R-15	6	Y	N	36°53.459N	114°16.058W	9.7	Permanent	0.006	Existing double 36-inch culverts, wooden culvert marker 9-5/10. Wash width between 4 and 6 feet.
R-16	6	Y	N	36°53.499N	114°16.033W	9.7	Permanent	0.006	Existing single culvert, wash approximately 6 feet wide.
R-17	10	Y	N	36°53.660N	114°16.029W	10.0	Permanent	0.01	Existing single 36-inch culvert, wooden culvert marker 9-7/10. Wash width approximately 10 feet. In Realignment Area #6.
R-18	6	Y	N	36°53.856N	114°15.932W	10.4	Permanent	0.006	No culvert—wash width varies between 1 and 6 feet.
R-19	6	Y	N	36°53.893N	114°15.932W	10.4	Permanent	0.006	No existing culvert. In Realignment Area #7.
R-20	6	Y	N	36°54.040N	114°15.975W	10.6	Permanent	0.006	No existing culvert.

TABLE 1
Summary of Waters of United States Observed Within the Proposed Action and Alternative 3

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
R-21	8	Y	N	36°54.109N	114°15.789W	10.8	Permanent	0.008	No existing culvert. In Realignment Area #8.
R-22	4	Y	N	36°54.272N	114°15.590W	11.1	Permanent	0.004	No existing culvert. In Realignment Area #8 and 9.
R-23	15	Y	N	36°54.403N	114°15.466W	11.3	Permanent	0.02	No existing culvert. In Realignment Area #9.
R-24	6	Y	N	36°54.444N	114°15.400W	11.4	Permanent	0.006	No culvert, wash consists of two small channels. Incised, gravel channels. In Realignment Area #9.
R-25	4	Y	N	36°54.568N	114°15.382W	11.6	Permanent	0.004	No existing culvert. In Realignment Area #10.
R-26	2	Y	N	36°54.626N	114°15.381W	11.7	Permanent	0.002	No existing culvert. In Realignment Area #10.
R-27	2	N	N	36°54.662N	114°15.381W	11.8	Permanent	0.002	Wash only on east side of road, but does not parallel road. In Realignment Area #10.
R-28	4	Y	N	36°54.742N	114°15.025W	11.9	Permanent	0.004	No existing culvert. In Realignment Area #10.
R-29	2	N	N	36°54.872N	114°15. W	12.1	Permanent	0.002	Wash only on east side of road, but does not parallel road.
R-30	2	N	N	36°54.958N	114°15. W	12.2	Permanent	0.002	Wash only on east side of road, but does not parallel road.
R-31	6	Y	N	36°54.998N	114°15.708W	12.3	Permanent	0.006	Wash on west side, then drains into road. In Realignment Area #11.
R-32	20	Y	N	36°55.012N	114°14.652W	12.4	Permanent	0.04	Two washes next to each other, both are 20 feet wide. In Realignment Area #11.
R-33	10	Y	N	36°55.094N	114°14. W	12.5	Permanent	0.01	No existing culvert; gravel substrate. In Realignment Area #11.

TABLE 1
Summary of Waters of United States Observed Within the Proposed Action and Alternative 3

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
R-34	1	Y	N	36°55.471N	114°14.156W	13.1	Permanent	0.001	No existing culvert. In Realignment Area #12.
R-35	1	N	Y	36°55.730N	114°13.851W	13.5	Permanent	0.001	Wash only on east side of road, but does not parallel road. In Realignment Area #12.
R-36	3	Y	N	36°55.937N	114°13.707W	13.8	Permanent	0.003	Parallels road, then crosses road. No existing culvert. Same wash as Wash A on Plant Site.
R-37	2	Y	N	36°56.027N	114°13.522W	14.1	Permanent	0.002	No existing culvert, near southern edge of plant site. In Realignment Area #13. Same wash as Wash B on Plant Site.
R-38	6	Y	N	36°56.287N	114°13.673W		Permanent	0.006	No existing culvert.
							Total Impact:	**0.331**	

Notes:

- Waters of United States are numbered sequentially from south to north.
- Approximate latitude and longitude of Waters of United States were estimated using a hand-held global positioning unit, and have not been differentially corrected. GPS unit inoperable at some locations.
- Delineations of Waters of United States were approved during a site visit with Grady McNure/USACE on November 14, 2002.
- Approximate roadway Milepost increases from south to north along existing track road and is based on auto odometer. Odometer set to 0.0 at end of existing pavement.
- Unless otherwise noted, calculation of approximate area of impact based on proposed typical roadway cross-section width of 45 feet.
- Realignment Areas drawings dated November 1, 2002.

TABLE 1
Summary of Waters of United States Observed Within the Proposed Action and Alternative 3

Wash Designation	Wash Width (feet)	Intersects Plant Site	Parallels Plant Site	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
Waters of United States Present in Immediate Vicinity of Proposed Plant Site									
Wash A	8	Y	N	—	—	NA	Permanent	0	Same wash as Wash 36 along road alignment.
Wash B	8	Y	N	36°56.207N	114°13.854W	NA	Permanent	0.33	Length of impact within wash estimated to be 1,800 feet. Same wash as Wash 37 along road alignment.
							Total Impact:	**0.33**	

Notes:

- Waters of United States are numbered sequentially from south to north.
- Approximate latitude and longitude of Waters of United States were estimated using a hand-held global positioning unit, and have not been differentially corrected. GPS unit inoperable at some locations.
- Delineations of Waters of United States were approved during a site visit with Grady McNure/USACE on November 14, 2002.
- Calculation of approximate area of impact based on Plan View of Plant Site, Map 2-4 from EIS.
- Realignment Areas drawings dated November 1, 2002.

TABLE 1
Summary of Waters of United States Observed Within the Proposed Action and Alternative 3

Wash Designation	Wash Width (feet)	Intersects Pipeline	Parallels Pipeline	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
Waters of United States Present In Immediate Vicinity of Proposed Water Line									
P-1	5	Y	N	—	—	NA	Temporary	0.007	
P-2	10	Y	N	36°59.918N	114°16.159W	NA	Temporary	0.014	South Fork Toquop Wash.
P-3	6	Y	N	36°59.902N	114°16.419W	NA	Temporary	0.008	
P-4	2	Y	N	37°00.148N	114°16.575W	NA	Temporary	0.003	
P-5	4	Y	N	37°00.174N	114°16.593W	NA	Temporary	0.006	First wash on east side of Toquop Gap.
P-6	25-50	Y	Y	—	—	NA	Temporary	2.750	Toquop Wash, within Toquop Gap. Pipeline alignment parallels and intersects wash throughout Gap. Estimated impact of approximately 2,000 linear feet within wash.
P-7	20	Y	N	37°03.905N	114°18.026W	NA	Temporary	0.028	First wash on west side of Toquop Gap. Point at survey stake 2327.
P-8	6	Y	N	37°04.069N	114°17.969W	NA	Temporary	0.008	Parallels pipeline for approximately 60 feet. At survey stake 2334.
P-9	1	N	Y	37°04.231N	114°17.911W	NA	Temporary	0.001	Near survey stake 2340.
P-10	3	Y	N	37°04.384N	114°17.853W	NA	Temporary	0.004	Sam's Camp Wash. Near survey stake 2346.
							Total Impact:	**2.829**	

Notes:

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- Approximate latitude and longitude of Waters of United States were estimated using a hand-held global positioning unit, and have not been differentially corrected. GPS unit inoperable at some locations.
- Delineations of Waters of United States were not specifically reviewed during a site visit with Grady McNure/USACE on November 14, 2002. However, Mr. McNure did review limits of jurisdiction within Toquop Gap.
- Calculation of approximate area of impact based on construction right-of-way width of 60 feet.

TABLE 2
Summary of Waters of United States Observed Within Alternative 1

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
Waters of United States Present in Immediate Vicinity of Proposed Access Road Between I-15 and Plant Site									
R-1	10	N	Y	36°46.754N	114°13.742W	0.3-0.8	Permanent	0.013	Wash located on west side of road, narrows from 10 feet to 4 feet in width. Approximately 40 feet from road at MP 0.3. At MP 0.9 wash is at edge of road and is 4 feet wide. If impacted on west side area of impact estimated to be 150 feet by 4 feet.
R-2	6	Y	Y	—	—	1.0	Permanent	0.007	Wash arises from roadside drainage, then flows east. Area of impact is approximately 50 feet in length and 6 feet width.
R-3	12	Y	N	36°49.288N	114°17.844W	3.2	Permanent	0.01	Existing single 36-inch culvert. Wash approximately 12 feet wide and potential impact may extend approximately 50 feet on western side of road. In Realignment Area #1.
R-4	4	Y	N	—	—	4.4	Permanent	0.06	Located within Realignment Area #3. Roadway cross section estimated to be 700 feet wide.
R-5	6	Y	N	36°50.220N	114°18.062W	4.5	Permanent	0.006	Existing single 12-inch culvert. Wash approximately 6 feet wide.
R-6	3	Y	N	36°50.311N	114°18.332W	4.7	Permanent	0.003	Existing single 24-inch culvert. Wash approximately 3 feet wide.
R-7	10	Y	N	36°51.445N	114°18.480W	6.0	Permanent	0.01	Single 36-inch culvert. Wash varies from 5 to 10 feet in width.
R-8	2	Y	N	36°51.486N	114°18.445W	6.5	Permanent	0.002	Single 24-inch culvert. Two small 1-foot washes converge.

TABLE 2
Summary of Waters of United States Observed Within Alternative 1

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
R-9	10 to 20	N	Y	36°51.486N	114°18.481W	6.5-6.6	None	0	Wash located west of and near base of roadway and parallels road—road could be widened to the east to avoid impacts.
R-10	3	Y	N	36°52.407N	114°17.411W	7.8	Permanent	0.003	Existing culvert, wooden culvert marker 7-7/10. Flows west to wash. In Realignment Area #5.
R-11	20	N	Y	36°52.689N	114°17.072W	8.2	None	0	Wash parallels road on west side. Wash width varies from 15 to 20 feet wide; approximately 10 feet from road. In Realignment Area #5.
R-12	25	Y	N	36°52.840N	114°16.674W	8.7	Permanent	0.03	Existing three 36-inch culverts, wash approximately 25 feet wide. In Realignment Area #5.
R-13	15	Y	N	36°52.905N	114°16.657W	8.8	Permanent	0.02	Two 36-inch culverts, wash approximately 15 feet wide. In Realignment Area #5.
R-14	4	Y	N	36°53.097N	114°16.285W	9.2	Permanent	0.004	Existing 24-inch culvert, wooden culvert marker 9-1/10. Wash approximately 4 feet wide.
R-15	6	Y	N	36°53.459N	114°16.058W	9.7	Permanent	0.006	Existing double 36-inch culverts, wooden culvert marker 9-5/10. Wash width between 4 and 6 feet.
R-16	6	Y	N	36°53.499N	114°16.033W	9.7	Permanent	0.006	Existing single culvert, wash approximately 6 feet wide.
R-17	10	Y	N	36°53.660N	114°16.029W	10.0	Permanent	0.01	Existing single 36-inch culvert, wooden culvert marker 9-7/10. Wash width approximately 10 feet. In Realignment Area #6.
R-18	6	Y	N	36°53.856N	114°15.932W	10.4	Permanent	0.006	No culvert—wash width varies between 1 and 6 feet.

TABLE 2
Summary of Waters of United States Observed Within Alternative 1

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
R-19	6	Y	N	36°53.893N	114°15.932W	10.4	Permanent	0.006	No existing culvert. In Realignment Area #7.
R-20	6	Y	N	36°54.040N	114°15.975W	10.6	Permanent	0.006	No existing culvert.
R-21	8	Y	N	36°54.109N	114°15.789W	10.8	Permanent	0.008	No existing culvert. In Realignment Area #8.
R-22	4	Y	N	36°54.272N	114°15.590W	11.1	Permanent	0.004	No existing culvert. In Realignment Area #8 and 9.
R-23	15	Y	N	36°54.403N	114°15.466W	11.3	Permanent	0.02	No existing culvert. In Realignment Area #9.
R-24	6	Y	N	36°54.444N	114°15.400W	11.4	Permanent	0.006	No culvert, wash consists of two small channels. Incised, gravel channels. In Realignment Area #9.
R-25	4	Y	N	36°54.568N	114°15.382W	11.6	Permanent	0.004	No existing culvert. In Realignment Area #10.
R-26	2	Y	N	36°54.626N	114°15.381W	11.7	Permanent	0.002	No existing culvert. In Realignment Area #10.
R-27	2	N	N	36°54.662N	114°15.381W	11.8	Permanent	0.002	Wash only on east side of road, but does not parallel road. In Realignment Area #10.
R-28	4	Y	N	36°54.742N	114°15.025W	11.9	Permanent	0.004	No existing culvert. In Realignment Area #10.
R-29	2	N	N	36°54.872N	114°15. W	12.1	Permanent	0.002	Wash only on east side of road, but does not parallel road.
R-30	2	N	N	36°54.958N	114°15. W	12.2	Permanent	0.002	Wash only on east side of road, but does not parallel road.
R-31	6	Y	N	36°54.998N	114°15.708W	12.3	Permanent	0.006	Wash on west side, then drains into road. In Realignment Area #11.

TABLE 2
Summary of Waters of United States Observed Within Alternative 1

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
R-32	20	Y	N	36°55.012N	114°14.652W	12.4	Permanent	0.04	Two washes next to each other, both are 20 feet wide. In Realignment Area #11.
R-33	10	Y	N	36°55.094N	114°14. W	12.5	Permanent	0.01	No existing culvert; gravel substrate. In Realignment Area #11.
R-+4	1	Y	N	36°55.471N	114°14.156W	13.1	Permanent	0.001	No existing culvert. In Realignment Area #12.
R-35	1	N	Y	36°55.730N	114°13.851W	13.5	Permanent	0.001	Wash only on east side of road, but does not parallel road. In Realignment Area #12.
R-36	3	Y	N	36°55.937N	114°13.707W	13.8	Permanent	0.003	Parallels road, then crosses road. No existing culvert. Same wash as Wash A on Plant Site.
R-37	2	Y	N	36°56.027N	114°13.522W	14.1	Permanent	0.002	No existing culvert, near southern edge of plant site. In Realignment Area #13. Same wash as Wash B on Plant Site.
R-38	6	Y	N	36°56.287N	114°13.673W		Permanent	0.006	No existing culvert.
							Total Impact:	**0.331**	

Notes:

- Waters of United States are numbered sequentially from south to north.
- Approximate latitude and longitude of Waters of United States were estimated using a hand-held global positioning unit, and have not been differentially corrected. GPS unit inoperable at some locations.
- Delineations of Waters of United States were approved during a site visit with Grady McNure/USACE on November 14, 2002.
- Approximate roadway Milepost increases from south to north along existing track road and is based on auto odometer. Odometer set to 0.0 at end of existing pavement.
- Unless otherwise noted, calculation of approximate area of impact based on proposed typical roadway cross-section width of 45 feet.
- Realignment Areas drawings dated November 1, 2002.

TABLE 2
Summary of Waters of United States Observed Within Alternative 1

Wash Designation	Wash Width (feet)	Intersects Plant Site	Parallels Plant Site	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
Waters of United States Present in Immediate Vicinity of Proposed Plant Site									
Wash A	8	Y	N	—	—	NA	Permanent	0	Same wash as Wash 36 along road alignment.
Wash B	8	Y	N	36°56.207N	114°13.854W	NA	Permanent	0.33	Length of impact within wash estimated to be 1,800 feet. Same wash as Wash 37 along road alignment.
							Total Impact:	**0.33**	

Notes:

- Waters of United States are numbered sequentially from south to north.
- Approximate latitude and longitude of Waters of United States were estimated using a hand-held global positioning unit, and have not been differentially corrected. GPS unit inoperable at some locations.
- Delineations of Waters of United States were approved during a site visit with Grady McNure/USACE on November 14, 2002.
- Calculation of approximate area of impact based on Plan View of Plant Site, Map 2-4 from EIS.
- Realignment Areas drawings dated November 1, 2002.

TABLE 2
Summary of Waters of United States Observed Within Alternative 1

Wash Designation	Wash Width (feet)	Intersects Pipeline	Parallels Pipeline	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
Waters of United States Present In Immediate Vicinity of Proposed Water Line									
P-1	3	Y	N	36°56.364N	114°13.742W	NA	Temporary	0.004	
P-2	4	Y	N	36°56.543N	114°13.623W	NA	Temporary	0.006	
P-3	2	Y	N	36°56.854N	114°13.413W	NA	Temporary	0.003	
P-4	2	Y	N	36°56.885N	114°13.397W	NA	Temporary	0.003	
P-5	3	Y	N	36°56.987N	114°13.324W	NA	Temporary	0.004	
P-6	5	Y	N	36°57.004N	114°13.318W	NA	Temporary	0.007	
P-7	5	Y	N	36°58.421N	114.13.098 West	NA	Temporary	0.007	
P-8	3	Y	N	36°58.249N	114.13.101 West	NA	Temporary	0.004	
P-9	2	Y	N	36°58.068N	114.13.098 West	NA	Temporary	0.003	
P-10	3	Y	N	36°58.018N	114.13.101 West	NA	Temporary	0.004	
P-11	10	Y	N	36°57.953N	114.13.102 West	NA	Temporary	0.014	
P-12	2	Y	N	36°57.920N	114.13.102 West	NA	Temporary	0.003	
P-13	6	Y	N	36°57.864N	114.13.100 West	NA	Temporary	0.008	
P-14	2	Y	N	36°57.845N	114.13.102 West	NA	Temporary	0.003	
P-15	2	Y	N	36°57.832N	114.13.101 West	NA	Temporary	0.003	

TABLE 2
Summary of Waters of United States Observed Within Alternative 1

Wash Designation	Wash Width (feet)	Intersects Pipeline	Parallels Pipeline	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
P-16	2	Y	N	36°57.805N	114.13.099 West	NA	Temporary	0.003	
P-17	5	Y	N	36°57.707N	114.13.103 West	NA	Temporary	0.007	
P-18	2	Y	N	37°00.116N	114°13.637W	NA	Temporary	0.003	
P-19	2	Y	N	37°00.116N	114°13.637W	NA	Temporary	0.003	Approximately 25 feet from Wash 21.
P-20	4	Y	Y	37°00.250N	114°13.894W	NA	Temporary	0.006	
P-21	2	Y	N	37°00.447N	114°13.929W	NA	Temporary	0.003	
P-22	2	Y	Y	37°01.029N	114°14.236W	NA	Temporary	0.003	One wash on each side of road, each 2 feet wide.
P-23	1	Y	N	37°01.454N	114°14.236W	NA	Temporary	0.001	
P-24	1	Y	N	37°01.494N	114°14.398W	NA	Temporary	0.001	
P-25	6	Y	N	37°01.578N	114°14.433W	NA	Temporary	0.008	
P-26	3	Y	Y	37°01.612N	114°14.434W	NA	Temporary	0.004	Between survey stakes 1251 and 1252.
P-27	1	Y	Y	37°01.720N	114°14.449W	NA	Temporary	0.001	Wash on east side only, flows into road.
P-28	3	Y	Y	37°01.881N	114°14.495W	NA	Temporary	0.004	Road would impact wash, but pipeline would not.
P-29	3	Y	N	37°02.090N	114°14.871W	NA	Temporary	0.004	
P-30	2	Y	Y	37°02.145N	114°14.900W	NA	Temporary	0.003	Desert tortoise in burrow noted near this location.
P-31	10	Y	N	37°02.387N	114°14.799W	NA	Temporary	0.014	
P-32	10	Y	N	37°02.531N	114°14.781W	NA	Temporary	0.014	
P-33	15	Y	N	37°02.687N	114°14.781W	NA	Temporary	0.021	Three washes converge at road.

TABLE 2
Summary of Waters of United States Observed Within Alternative 1

Wash Designation	Wash Width (feet)	Intersects Pipeline	Parallels Pipeline	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
P-34	8	Y	Y	37°02.743N	114°14.803W	NA	Temporary	0.011	Several washes converge at road.
P-35	3	Y	N	37°02.816N	114°14.842W	NA	Temporary	0.004	
P-36	2	Y	N	37°02.842N	114°14.869W	NA	Temporary	0.003	
P-37	2	Y	N	37°03.005N	114°14.876W	NA	Temporary	0.003	
P-38	15	Y	N	37°03.179N	114°14.892W	NA	Temporary	0.021	
P-39	2	Y	N	37°03.592N	114°15.082W	NA	Temporary	0.003	
P-40	1	Y	N	37°03.684N	114°15.153W	NA	Temporary	0.001	
P-41	10	Y	N	37°03.744N	114°15.216W	NA	Temporary	0.014	
P-42	1	Y	N	37°03.800N	114°15.249W	NA	Temporary	0.001	
P-43	10	Y	N	37°03.849N	114°15.309W	NA	Temporary	0.014	
P-44	5	Y	N	37°03.923N	114°15.389W	NA	Temporary	0.007	
P-45	5	Y	Y	37°03.980N	114°15.443W	NA	Temporary	0.007	
P-46	3	Y	N	37°04.040N	114°15.493W	NA	Temporary	0.004	2 channels 15 feet apart that cross road, see next entry.
P-47	3	Y	N	37°04.040N	114°15.493W	NA	Temporary	0.004	2 channels 15 feet apart that cross road, see previous entry.
P-48	3	Y	N	37°04.334N	114°15.800W	NA	Temporary	0.004	
P-49	5	Y	N	37°04.369N	114°15.994W	NA	Temporary	0.007	
P-50	4	Y	N	37°04.542N	114°15.994W	NA	Temporary	0.006	
P-51	4	Y	Y	37°04.685N	114°16.096W	NA	Temporary	0.006	Wash on west side of road only.
P-52	6	Y	N	37°04.819N	114°16.195W	NA	Temporary	0.008	

TABLE 2
Summary of Waters of United States Observed Within Alternative 1

Wash Designation	Wash Width (feet)	Intersects Pipeline	Parallels Pipeline	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
P-53	5	Y	N	37°04.864N	114°16.218W	NA	Temporary	0.007	
P-54	50	Y	N	37°05.105N	114°16.429W	NA	Temporary	0.069	Sam's Camp Wash.
							Total Impact:	**0.383**	

Notes:

- Waters of United States are numbered sequentially from south to north.
- Approximate latitude and longitude of Waters of United States were estimated using a hand-held global positioning unit, and have not been differentially corrected. GPS unit inoperable at some locations.
- Delineations of Waters of United States along alternative pipeline route were not specifically reviewed during a site visit with Grady McNure/USACE on November 14, 2002.
- Calculation of approximate area of impact based on construction right-of-way width of 60 feet.

TABLE 3
Summary of Waters of United States Observed Within Alternative 2

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
Waters of United States Present in Immediate Vicinity of Proposed Access Road Between I-15 and the Southern Plant Site									
R-1	10	N	Y	36°46.754N	114°13.742W	0.3-0.8	Permanent	0.013	Wash located on west side of road, narrows from 10 feet to 4 feet in width. Approximately 40 feet from road at MP 0.3. At MP 0.9 wash is at edge of road and is 4 feet wide. If impacted on west side area of impact estimated to be 150 feet by 4 feet.
R-2	6	Y	Y	—	—	1.0	Permanent	0.007	Wash arises from roadside drainage, then flows east. Area of impact is approximately 50 feet in length and 6 feet width.
R-3	12	Y	N	36°49.288N	114°17.844W	3.2	Permanent	0.01	Existing single 36-inch culvert. Wash approximately 12 feet wide and potential impact may extend approximately 50 feet on western side of road. In Realignment Area #1.
R-4	4	Y	N	—	—	4.4	Permanent	0.06	Located within Realignment Area #3. Roadway cross section estimated to be 700 feet wide.
R-5	6	Y	N	36°50.220N	114°18.062W	4.5	Permanent	0.006	Existing single 12-inch culvert. Wash approximately 6 feet wide.
R-6	3	Y	N	36°50.311N	114°18.332W	4.7	Permanent	0.003	Existing single 24-inch culvert. Wash approximately 3 feet wide.
R-7	10	Y	N	36°51.445N	114°18.480W	6.0	Permanent	0.01	Single 36-inch culvert. Wash varies from 5 to 10 feet in width.
R-8	2	Y	N	36°51.486N	114°18.445W	6.5	Permanent	0.002	Single 24-inch culvert. Two small 1-foot washes converge.

TABLE 3
Summary of Waters of United States Observed Within Alternative 2

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
R-9	10 to 20	N	Y	36°51.486N	114°18.481W	6.5-6.6	None	0	Wash located west of and near base of roadway and parallels road—road could be widened to the east to avoid impacts.
R-10	3	Y	N	36°52.407N	114°17.411W	7.8	Permanent	0.003	Existing culvert, wooden culvert marker 7-7/10. Flows west to wash. In Realignment Area #5.
R-11	20	N	Y	36°52.689N	114°17.072W	8.2	None	0	Wash parallels road on west side. Wash width varies from 15 to 20 feet wide; approximately 10 feet from road. In Realignment Area #5.
R-12	25	Y	N	36°52.840N	114°16.674W	8.7	Permanent	0.03	Existing three 36-inch culverts, wash approximately 25 feet wide. In Realignment Area #5.
R-13	15	Y	N	36°52.905N	114°16.657W	8.8	Permanent	0.02	Two 36-inch culverts, wash approximately 15 feet wide. In Realignment Area #5.
R-14	4	Y	N	36°53.097N	114°16.285W	9.2	Permanent	0.004	Existing 24-inch culvert, wooden culvert marker 9-1/10. Wash approximately 4 feet wide.
R-15	6	Y	N	36°53.459N	114°16.058W	9.7	Permanent	0.006	Existing double 36-inch culverts, wooden culvert marker 9-5/10. Wash width between 4 and 6 feet.
R-16	6	Y	N	36°53.499N	114°16.033W	9.7	Permanent	0.006	Existing single culvert, wash approximately 6 feet wide.
R-17	10	Y	N	36°53.660N	114°16.029W	10.0	Permanent	0.01	Existing single 36-inch culvert, wooden culvert marker 9-7/10. Wash width approximately 10 feet. In Realignment Area #6.
R-18	6	Y	N	36°53.856N	114°15.932W	10.4	Permanent	0.006	No culvert—wash width varies between 1 and 6 feet.

TABLE 3
Summary of Waters of United States Observed Within Alternative 2

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
R-19	6	Y	N	36°53.893N	114°15.932W	10.4	Permanent	0.006	No existing culvert. In Realignment Area #7.
R-20	6	Y	N	36°54.040N	114°15.975W	10.6	Permanent	0.006	No existing culvert.
R-21	8	Y	N	36°54.109N	114°15.789W	10.8	Permanent	0.008	No existing culvert. In Realignment Area #8.
R-22	4	Y	N	36°54.272N	114°15.590W	11.1	Permanent	0.004	No existing culvert. In Realignment Area #8 and 9.
R-23	15	Y	N	36°54.403N	114°15.466W	11.3	Permanent	0.02	No existing culvert. In Realignment Area #9.
R-24	6	Y	N	36°54.444N	114°15.400W	11.4	Permanent	0.006	No culvert, wash consists of two small channels. Incised, gravel channels. In Realignment Area #9.
R-25	4	Y	N	36°54.568N	114°15.382W	11.6	Permanent	0.004	No existing culvert. In Realignment Area #10.
R-26	2	Y	N	36°54.626N	114°15.381W	11.7	Permanent	0.002	No existing culvert. In Realignment Area #10.
R-27	2	N	N	36°54.662N	114°15.381W	11.8	Permanent	0.002	Wash only on east side of road, but does not parallel road. In Realignment Area #10.
R-28	4	Y	N	36°54.742N	114°15.025W	11.9	Permanent	0.004	No existing culvert. In Realignment Area #10.
R-29	2	N	N	36°54.872N	114°15. W	12.1	Permanent	0.002	Wash only on east side of road, but does not parallel road.
R-30	2	N	N	36°54.958N	114°15. W	12.2	Permanent	0.002	Wash only on east side of road, but does not parallel road.
R-31	6	Y	N	36°54.998N	114°15.708W	12.3	Permanent	0.006	Wash on west side, then drains into road. In Realignment Area #11.

TABLE 3
Summary of Waters of United States Observed Within Alternative 2

Wash Designation	Wash Width (feet)	Intersects Road	Parallels Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impact	Approximate Impact (acres)	Comments
R-32	20	Y	N	36°55.012N	114°14.652W	12.4	Permanent	0.04	Two washes next to each other, both are 20 feet wide. In Realignment Area #11.
R-33	10	Y	N	36°55.094N	114°14. W	12.5	Permanent	0.01	No existing culvert; gravel substrate. In Realignment Area #11.
R-34	1	Y	N	36°55.471N	114°14.156W	13.1	Permanent	0.001	No existing culvert. In Realignment Area #12.
R-35	1	N	Y	36°55.730N	114°13.851W	13.5	Permanent	0.001	Wash only on east side of road, but does not parallel road. In Realignment Area #12.
R-36	3	Y	N	36°55.937N	114°13.707W	13.8	Permanent	0.003	Parallels road, then crosses road. No existing culvert. Same wash as Wash A on Plant Site.
R-37	2	Y	N	36°56.027N	114°13.522W	14.1	Permanent	0.002	No existing culvert, near southern edge of plant site. In Realignment Area #13. Same wash as Wash B on Plant Site.
R-38	6	Y	N	36°56.287N	114°13.673W		Permanent	0.006	No existing culvert.
							Total Impact:	**0.331**	

Notes:

- Waters of United States are numbered sequentially from south to north.
- Approximate latitude and longitude of Waters of United States were estimated using a hand-held global positioning unit, and have not been differentially corrected. GPS unit inoperable at some locations.
- Delineations of Waters of United States were approved during a site visit with Grady McNure/USACE on November 14, 2002.
- Approximate roadway Milepost increases from south to north along existing track road and is based on auto odometer. Odometer set to 0.0 at end of existing pavement.
- Unless otherwise noted, calculation of approximate area of impact based on proposed typical roadway cross-section width of 45 feet.
- Realignment Areas drawings dated November 1, 2002.
- No waters of the United States are present within the footprint of the northern plant site.

TABLE 3
Summary of Waters of United States Observed Within Alternative 2

Wash Designation	Wash Width (feet)	Intersects Pipeline/ Road	Parallels Pipeline/ Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
Waters of United States Present In Immediate Vicinity of Proposed Water Line and Roadway Improvements Between the Southern Plant Site and the Northern Plant Site									
P-1	3	Y	N	36°56.364N	114°13.742W	NA	Temp and Perm	0.004	
P-2	4	Y	N	36°56.543N	114°13.623W	NA	Temp and Perm	0.006	
P-3	2	Y	N	36°56.854N	114°13.413W	NA	Temp and Perm	0.003	
P-4	2	Y	N	36°56.885N	114°13.397W	NA	Temp and Perm	0.003	
P-5	3	Y	N	36°56.987N	114°13.324W	NA	Temp and Perm	0.004	
P-6	5	Y	N	36°57.004N	114°13.318W	NA	Temp and Perm	0.007	
P-7	5	Y	N	36°58.421N	114.13.098 West	NA	Temp and Perm	0.007	
P-8	3	Y	N	36°58.249N	114.13.101 West	NA	Temp and Perm	0.004	
P-9	2	Y	N	36°58.068N	114.13.098 West	NA	Temp and Perm	0.003	
P-10	3	Y	N	36°58.018N	114.13.101 West	NA	Temp and Perm	0.004	
P-11	10	Y	N	36°57.953N	114.13.102 West	NA	Temp and Perm	0.014	
P-12	2	Y	N	36°57.920N	114.13.102 West	NA	Temp and Perm	0.003	

TABLE 3
Summary of Waters of United States Observed Within Alternative 2

Wash Designation	Wash Width (feet)	Intersects Pipeline/ Road	Parallels Pipeline/ Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
P-13	6	Y	N	36°57.864N	114.13.100 West	NA	Temp and Perm	0.008	
P-14	2	Y	N	36°57.845N	114.13.102 West	NA	Temp and Perm	0.003	
P-15	2	Y	N	36°57.832N	114.13.101 West	NA	Temp and Perm	0.003	
P-16	2	Y	N	36°57.805N	114.13.099 West	NA	Temp and Perm	0.003	
P-17	5	Y	N	36°57.707N	114.13.103 West	NA	Temp and Perm	0.007	
P-18	2	Y	N	37°00.116N	114°13.637W	NA	Temp and Perm	0.003	
P-19	2	Y	N	37°00.116N	114°13.637W	NA	Temp and Perm	0.003	Approximately 25 feet from Wash 21.
P-20	4	Y	Y	37°00.250N	114°13.894W	NA	Temp and Perm	0.006	
P-21	2	Y	N	37°00.447N	114°13.929W	NA	Temp and Perm	0.003	
P-22	2	Y	Y	37°01.029N	114°14.236W	NA	Temp and Perm	0.003	One wash on each side of road, each 2 feet wide.
P-23	1	Y	N	37°01.454N	114°14.236W	NA	Temp and Perm	0.001	
P-24	1	Y	N	37°01.494N	114°14.398W	NA	Temp and Perm	0.001	
P-25	6	Y	N	37°01.578N	114°14.433W	NA	Temp and Perm	0.008	
P-26	3	Y	Y	37°01.612N	114°14.434W	NA	Temp and Perm	0.004	Between survey stakes 1251 and 1252.

TABLE 3
Summary of Waters of United States Observed Within Alternative 2

Wash Designation	Wash Width (feet)	Intersects Pipeline/ Road	Parallels Pipeline/ Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
P-27	1	Y	Y	37°01.720N	114°14.449W	NA	Temp and Perm	0.001	Wash on east side only, flows into road.
P-28	3	Y	Y	37°01.881N	114°14.495W	NA	Temp and Perm	0.004	Road would impact wash, but pipeline would not.
P-29	3	Y	N	37°02.090N	114°14.871W	NA	Temp and Perm	0.004	
P-30	2	Y	Y	37°02.145N	114°14.900W	NA	Temp and Perm	0.003	Desert tortoise in burrow noted near this location.
P-31	10	Y	N	37°02.387N	114°14.799W	NA	Temp and Perm	0.014	
P-32	10	Y	N	37°02.531N	114°14.781W	NA	Temp and Perm	0.014	
P-33	15	Y	N	37°02.687N	114°14.781W	NA	Temp and Perm	0.021	Three washes converge at road.
P-34	8	Y	Y	37°02.743N	114°14.803W	NA	Temp and Perm	0.011	Several washes converge at road.
P-35	3	Y	N	37°02.816N	114°14.842W	NA	Temp and Perm	0.004	
P-36	2	Y	N	37°02.842N	114°14.869W	NA	Temp and Perm	0.003	
P-37	2	Y	N	37°03.005N	114°14.876W	NA	Temp and Perm	0.003	
P-38	15	Y	N	37°03.179N	114°14.892W	NA	Temp and Perm	0.021	
P-39	2	Y	N	37°03.592N	114°15.082W	NA	Temp and Perm	0.003	
P-40	1	Y	N	37°03.684N	114°15.153W	NA	Temp and Perm	0.001	

TABLE 3
Summary of Waters of United States Observed Within Alternative 2

Wash Designation	Wash Width (feet)	Intersects Pipeline/ Road	Parallels Pipeline/ Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
P-41	10	Y	N	37°03.744N	114°15.216W	NA	Temp and Perm	0.014	
P-42	1	Y	N	37°03.800N	114°15.249W	NA	Temp and Perm	0.001	
P-43	10	Y	N	37°03.849N	114°15.309W	NA	Temp and Perm	0.014	
P-44	5	Y	N	37°03.923N	114°15.389W	NA	Temp and Perm	0.007	
P-45	5	Y	Y	37°03.980N	114°15.443W	NA	Temp and Perm	0.007	
P-46	3	Y	N	37°04.040N	114°15.493W	NA	Temp and Perm	0.004	Two channels 15 feet apart that cross road—see next entry.
P-47	3	Y	N	37°04.040N	114°15.493W	NA	Temp and Perm	0.004	Two channels 15 feet apart that cross road—see previous entry.
P-48	3	Y	N	37°04.334N	114°15.800W	NA	Temp and Perm	0.004	
P-49	5	Y	N	37°04.369N	114°15.994W	NA	Temp and Perm	0.007	
P-50	4	Y	N	37°04.542N	114°15.994W	NA	Temp and Perm	0.006	
P-51	4	Y	Y	37°04.685N	114°16.096W	NA	Temp and Perm	0.006	Wash on west side of road only.
P-52	6	Y	N	37°04.819N	114°16.195W	NA	Temp and Perm	0.008	

TABLE 3
Summary of Waters of United States Observed Within Alternative 2

Wash Designation	Wash Width (feet)	Intersects Pipeline/ Road	Parallels Pipeline/ Road	Latitude	Longitude	Approx. Milepost	Permanent or Temporary Impacts	Approximate Impact (acres)	Comments
P-53	5	Y	N	37°04.864N	114°16.218W	NA	Temp and Perm	0.007	
P-54	50	Y	N	37°05.105N	114°16.429W	NA	Temp and Perm	0.069	Sams Camp Wash.
							Total Impact:	**0.383**	

Notes:

- Waters of United States are numbered sequentially from south to north.
- Approximate latitude and longitude of Waters of United States were estimated using a hand-held global positioning unit, and have not been differentially corrected. GPS unit inoperable at some locations.
- Delineations of Waters of United States along alternative pipeline route were not specifically reviewed during a site visit with Grady McNure/USACE on November 14, 2002.
  Impacts associated with the water pipeline are temporary, whereas impacts associated with the roadway improvements are permanent.
- The roadway and pipeline in this segment are in close proximity, thus the same wash designation is used for both. Calculation of approximate area of impact based on construction right-of-way width of 60 feet for the pipeline.

Appendix G

Air Quality Dispersion Modeling Methodology

APPENDIX G

Air Quality Dispersion Modeling Methodology

Air quality impacts in the "Class II" areas surrounding the site were determined with the Industrial Source Complex Short-Term (ISCST3) dispersion model.

In the "complex" terrain of the East Mormon Mountains to the west of the proposed facility, the CTSCREEN model was used to refine the impacts. CTSCREEN is the screening mode of the Complex Terrain Dispersion Model (CTDMPLUS). CTSCREEN uses an array of predetermined meteorological conditions to model user-supplied source-terrain configurations.

The basic model equation assumes that concentrations of emissions within the plume can be characterized by a Gaussian distribution of the plume. For a steady-state Gaussian plume, the hourly concentration at downwind distance x (meters) and crosswind distance y (meters) is given by:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2(y/\sigma_y)^2}\right) * \left[\left\{e^{-1/2(z-H/\sigma_z)^2}\right\} + \left\{e^{-1/2(z+H/\sigma_z)^2}\right\}\right]$$

Where:

C	=	the concentration in the air of the substance or pollutant in question
Q	=	the pollutant emission rate
$\sigma_y\sigma_z$	=	the horizontal and vertical dispersion coefficients, respectively, at downwind distance x
u	=	the wind speed at the height of the plume center
x,y,z	=	the variables that define the three-dimensional Cartesian coordinate system used; the downwind, crosswind, and vertical distances from the base of the stack
H	=	the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises because of the momentum and/or buoyancy of the plume)

Both CTSCREEN and ISCST3 are based on the steady-state Gaussian plume equation. In general, Gaussian dispersion models are conservative by nature and tend to over-predict actual impacts

The model user inputs meteorological data for the site, data on the air emission rates and stack parameters, and data on the elevation and location of "receptors." The models then use mathematical correlations to predict resulting pollutant concentrations at the receptors.

Air quality impacts and air quality related values (AQRVs) for the Grand Canyon National Park Class I Area were determined with the CALPUFF model. CALPUFF is a non-steady-state air quality modeling system developed for regulatory use. CALPUFF is a Gaussian puff dispersion model with chemical removal, wet and dry deposition, complex terrain algorithms, building downwash, plume fumigation, and other effects. Puff models are demonstrated to be more accurate than Gaussian plume models for prediction of impacts in areas greater than 50 km distant from the emission source.

Puff models represent a continuous plume as a number of discrete packets of pollutant material. Most puff models evaluate the contribution of a puff to the concentration at a receptor by a "snapshot" approach. Each puff is "frozen" at a particular time interval. The concentration resulting from the "frozen" puff at that time is computed. The puff is then allowed to move, evolving in size, strength, etc., until the next sampling step. The total concentration at a receptor is the sum of the contribution of all nearby puffs averaged for all sampling steps within the basic time step.

The basic equation for the contribution of a puff at a receptor is:

$$C = \frac{Q}{2\pi\sigma_x\sigma_y}\, g\, \exp\left[-d_a^2/\left(2\sigma_x^2\right)\right]\exp\left[-d_c^2/\left(2\sigma_y^2\right)\right] \qquad (2\text{-}1)$$

$$g = \frac{2}{(2\pi)^{1/2}\,\sigma_z}\sum_{n}^{\infty}\exp\left[-(H+2nh)^2/\left(2\sigma_z^2\right)\right] \qquad (2\text{-}2)$$

Where, C is the ground-level concentration (g/m^3),

Q is the pollutant mass (g) in the puff,

σ_x is the standard deviation (m) of the Gaussian distribution in the along-wind direction,

σ_y is the standard deviation (m) of the Gaussian distribution in the cross-wind direction,

σ_z is the standard deviation (m) of the Gaussian distribution in the vertical direction,

d_a is the distance (m) from the puff center to the receptor in the along-wind direction,

d_c is the distance (m) from the puff center to the receptor in the cross-wind direction,

g is the vertical term (m) of the Gaussian equation,

H is the effective height (m) above the ground of the puff center, and

h is the mixed-layer height (m).

The summation in the vertical term, g, accounts for multiple reflections off the mixing lid and the ground. It reduces to the uniformly mixed limit of 1/h for $\sigma_z > 1.6h$. In general, puffs within the convective boundary layer meet this criterion within a few hours after release.

The buildings near the emission sources and potentially affecting downwash were analyzed using the Building Profile Input Program (BPIP) in order to estimate direction-specific building heights and projected building widths for use in building wake calculations. This information was input to the ISCST3 dispersion model.

Combustion turbines can operate over a variety of load conditions, resulting in a range of possible stack temperatures, exit velocities, and pollutant emission rates. As a result, the highest load condition for the turbine is not necessarily the most conservative case from an ambient impact prediction perspective. Therefore, a screening procedure was used to select the reasonable but conservative case parameters for modeling. In general, this means that lower stack temperatures and velocities, representing conditions for reduced turbine loading, were paired with higher emission rates, which would result from full turbine loading. Thus, the model input parameters could describe a situation which could never occur at the facility, but which would produce higher estimated ambient impacts than actual plant operating scenarios.

No meteorological stations exist in the Toquop area; therefore, no meteorological data sets meeting rigorous criteria for representativeness exist for the plant site. The Proposed Action potential impacts were modeled using a screening data set provided by NDEP BAQ. This file contains the SCREEN3 combinations of wind speed, stability class, and mixing height that are designed to capture a full range of possible dispersion conditions. Because the SCREEN3 meteorology does not incorporate wind direction, NDEP BAQ constructed the screening analysis input file by applying the full set of SCREEN3 combinations to each of 36 wind directions (each 10 degrees around the compass). Temperature is also not an explicit parameter built into the SCREEN3 meteorological combinations, so NDEP BAQ applied a range of temperatures (293, 298.7, 304.2, and 309.8 degrees Kelvin) to the full suite of combinations. Finally, mixing heights were assigned in accordance with the SCREEN3 Model Users Guide, as modified by NDEP BAQ. For neutral and unstable conditions, the SCREEN3 Model Users Guide recommends setting the mixing height at 10,000 meters to represent unlimited mixing. In the file constructed by NDEP BAQ, the mixing height was set to a more conservative value of 5,000 meters

For the complex terrain of the East Mormon Mountains, the USEPA's CTSCREEN model was used to predict impacts. As with the USEPA's SCREEN model, the CTSCREEN model uses a conservative meteorological data set to predict worst-case impacts. The CTSCREEN model has been demonstrated by the USEPA to estimate more accurate results, for complex terrain, than does the ISCST3 model. Complex terrain is defined as terrain with elevations

above the final anticipated plume height, as calculated based on the stack height and plume rise.

As mentioned above, Gaussian distribution models such as ISCST3, SCREEN3, and CTSCREEN are generally invalid for distances greater than 50 kilometers. The closest point of the Grand Canyon National Park is approximately 78 kilometers from the Proposed Action location. Therefore, the CALPUFF model was used to determine the ambient impacts, and impacts on air quality related values (AQRVs) for the Grand Canyon National Park. A complete analysis using CALPUFF incorporates the results of the Calmet preprocessor, which develops a three-dimensional, time-based meteorological data set for the area surrounding the site. A screening run using CALPUFF incorporates a standard meteorological data set available from the National Weather Service (NWS), along with a number of conservative assumptions, to predict results documented to be equal to or more conservative (higher) than the complete CALPUFF analysis. NWS data from Las Vegas were used to run CALPUFF in screening mode to predict ambient pollutant concentrations, visibility impairment, and acid deposition on the Grand Canyon National Park for the PSD permit application. A complete CALPUFF was also run to estimate visibility impacts on the GNCP for this DEIS.

Although it is not a federally designated Class I area, the National Park Service requested that impacts on the Lake Mead National Recreation Area (LMNRA) be predicted for the Proposed Action as part of the PSD permitting process. Regional haze visibility impacts were calculated for LMNRA using the same CALPUFF model as used for the Grand Canyon National Park. In addition, the VISCREEN model was used to estimate reasonable but conservative discreet plume visual impacts for LMNRA.

Appendix H

Bureau of Land Management
Visual Contrast Rating Worksheet

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	
District	
Resource Area	
Activity (program)	

SECTION A. PROJECT INFORMATION

1. Project Name Toquop Energy Project	4. Location Township 13S	5. Location Sketch See attached Figure 1 showing the location of KOP 1
2. Key Observation Point 1	Range 69E	
3. VRM Class III	Sections 5,8,16,17,20,28,29	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat desert terrain in foreground. Mountains in the distance. No water bodies evident.	Low-lying sparse vegetation typical of a desert landscape.	KOP 1 (Figure 2a) shows the existing paved frontage road in the immediate foreground (approximately 20 feet wide), and where it changes to a dirt roadway.
LINE	Horizontal line created by ground surface at base of mountains. Horizontal line created by paved frontage road. Vertical line created by unpaved continuation of frontage road (dirt road) through the center of photo (Figure 2a)	Cleared swath of land (vegetation removed exposing bare soil) along existing dirt roadway and cleared area where road turns (lower portion of photo in Figure 2a).	KOP 1 (Figure 2a) shows the existing paved road, the dirt road, and roadway signs on both signs of the dirt road.
COLOR	Tan and light brown in foreground. Mountains appear shades of gray and brown in distance.	Vegetation appears as shades of brown, reddish brown, with minor hues of yellow.	Paved road is charcoal gray with a double yellow median stripe and white lines marking the roadway edge.
TEX-TURE	Gravel and bare soil provide texture.	Vegetation throughout the photo (Figure 2a) provides texture.	Minimal texture provided by existing paved and dirt roads.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Paving the dirt road would occur, with widening the existing paved and unpaved road shown in the photo (Figure 2b).	Vegetation would be removed on both sides of the existing paved and dirt roadway to allow for roadway widening, creation of 2-foot shoulders, and the addition of ditches along the road (Figure 2b).	Roadway lanes widened to 24 feet, with 2-foot shoulders on both sides of the road, and 8.5-foot-wide dirt ditches (Figure 2b).
LINE	Minimal noticeable change to the horizontal line created by the paved frontage road. More noticeable vertical line created by paving the dirt road, resulting in moderate landscape change. Diagonal line created by dirt ditch on west side of road; this addition is a low to moderate change to the landscape.	Low to moderate change created by the clearing of vegetation due to dirt ditches. Low landscape change from the removal of vegetation due to roadway widening.	KOP 1 (Figure 2b) shows the proposed paved road, dirt ditches, and roadway sign.
COLOR	Tan and light brown in foreground. Mountains appear shades of gray and brown in distance.	Vegetation appears as shades of brown, reddish brown, with minor hues of yellow. Slightly less vegetation visible in Figure 2b when compared to Figure 2a.	Charcoal gray roadway with yellow and white striping.
TEX-TURE	Gravel and bare soil provide texture.	Minor change in vegetation due to vegetation removal for roadway widening results in little to no change in texture.	Minimal texture provided by proposed widened road.

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form		X					X				X	
	Line		X	X			X	X			X	X	
	Color			X				X				X	
	Texture			X				X				X	

2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended ☐ Yes ☒ No (Explain on reverse side)

Evaluator's Names: Wendy Haydon/CH2M HILL

Date: November 22, 2002

SECTION D. (Continued)

Comments from Item 2.

Interstate-15 (I-15) is a four-lane divided north/southbound freeway (two lanes in each direction) with paved shoulders in the vicinity of the Proposed Action access road. Near the access road, the freeway is oriented in an east/west direction. The speed limit along I-15 in the vicinity of the access road is 75 miles per hour. The East Mesa Interchange (Exit 109) is a truck parking lot; this exit provides access to the existing road that would become the project access road. The frontage road that parallels I-15 on both sides of the freeway at Exit 109 is a two-lane road. Access on both sides of the freeway from this exit is provided by 2 one-lane culverts that pass under the divided freeway.

The nearest I-15 offramp to the west of Exit 109 is Exit 100, located approximately 10 miles away. The closest I-15 offramp to the east of Exit 109 is Exit 112, located approximately 2 miles away. No services are offered at Exits 100, 109, or 112.

The northbound portion of the access road (See Figure 1) is only visible from I-15 when either northbound or southbound vehicles are passing by the frontage road where it turns northward. Visibility of the northbound dirt road is limited to approximately 0.4 mile from I-15. When vehicles are past it in either direction, it is screened from view due to the existing dirt/gravel roadbed being a little lower in elevation than the surrounding ground surface and low-lying desert vegetation.

No sensitive receptors are located in the vicinity of the proposed access road. The frontage road on the north side of I-15 that parallels I-15 is not visible from any of the lanes of I-15. Therefore, widening or other improvements to this section of roadway, as part of the Proposed Action, would not be evident.

Due to the steepness and narrowness of the paved shoulders along I-15 near Exit 109 and the high travel speeds of motorists on the freeway, it was deemed unsafe to take photographs for the visual simulation from the freeway shoulder. Photographs were taken from approximately 100 feet north of I-15, standing just north of a barbed wire fence that parallels the freeway, and approximately 100 feet south of the frontage road. Figure 2a shows the existing condition view of the frontage road and dirt road. Because of the inability to take the photograph from I-15, the simulated photograph (Figure 2b) depicts a closer view of the access road than what would be seen from the freeway. Even so, this simulated view was determined to have a Form, Color, and Texture contrast rating of weak, with the element Line receiving a weak to moderate contrast rating. In addition, view duration of the proposed access road would be only fleeting by motorists travelling at freeway speeds.

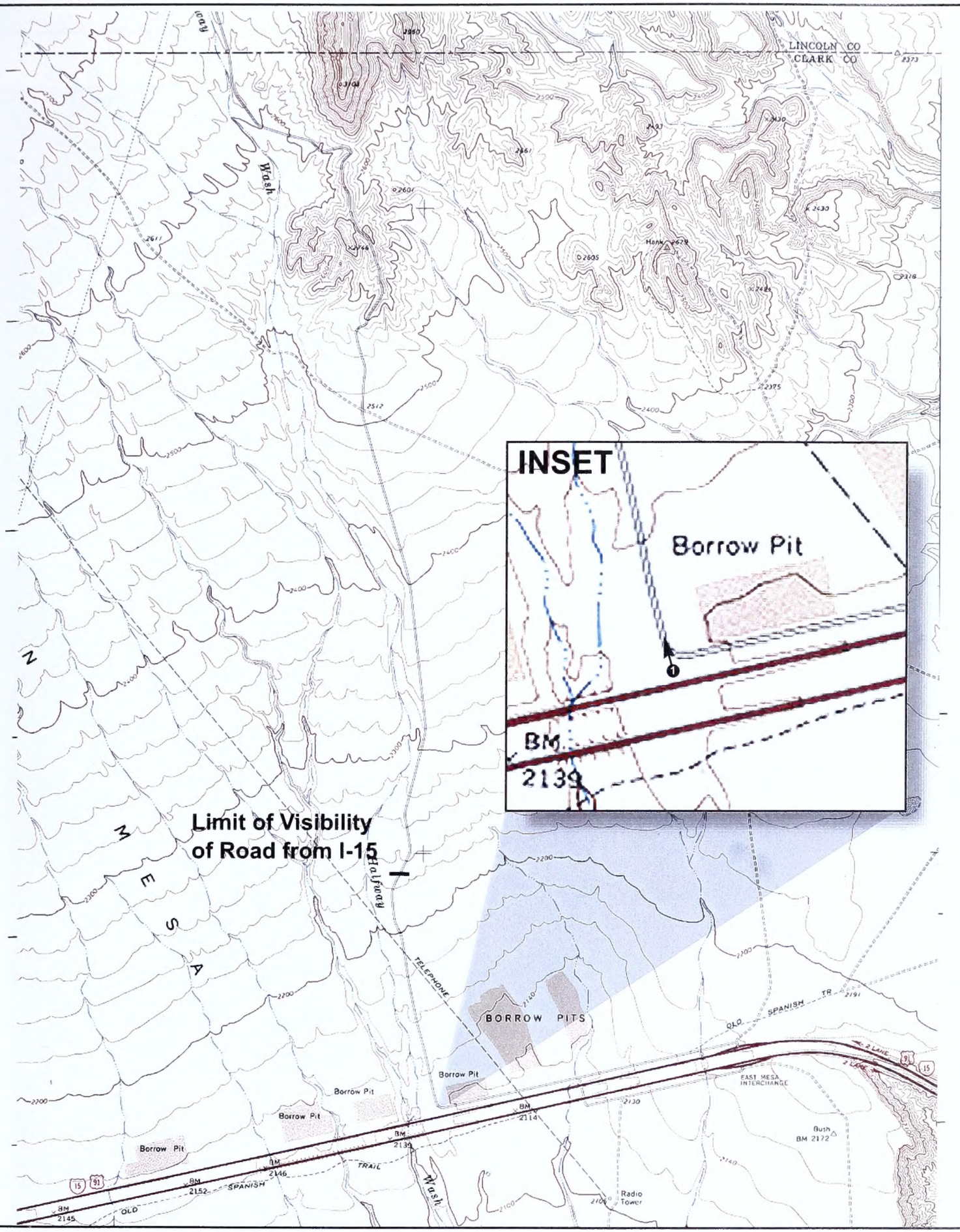
The upgraded access road would include paving, lane widening, the addition of paved shoulders, and the addition of 8.5-foot-wide ditches along the roadway. It is known that ditches on both sides of the roadway would not be necessary for the entire length of the access road. It has not been determined if a ditch would be required on both sides of the roadway in the 0.4 mile of the road that is visible from I-15. However, to represent the worst-case, the visual simulation was prepared assuming that a ditch would be required on both sides of the road. It was also assumed that the ditch on the west side of the road would continue south[1], rather than turning east where the road turns east to parallel I-15 (see Figure 2b).

[1] It is possible that the ditch would parallel the road, rather than continue south; however, the simulation depicts the ditch continuing south, to allow the roadway runoff to flow to the wash located to the west of the proposed access road.

Conclusion: Upgrading the frontage road and dirt road to that necessary for the Proposed Action would not degrade the existing view from I-15, would not dominate the view shown in Figures 2a and 2b, would not attract or focus the attention of the casual viewer away from the mountains in the distance, and would meet the objective of the BLM VRM Class III rating of the land.

Additional Mitigating Measures (See item 3)

None needed or recommended.



N

0 2500 FEET

= Key Observation Point (KOP)

Contour Interval 20 Feet

Location of Key Observation Point

SOURCE: Moapa Peak SE, Nev. 7.5 minute quadrangle map

TOQUOP_W112002004SAC_Fig_1_SITE_MAP.ai 11-18-2002sbm

Figure 1

CH2MHILL

Existing condition view of the frontage road that parallels I-15 on the north side of the freeway.
This is the view looking north where the frontage road turns northward.

KOP 1: Existing Condition

Figure 2a

Simulated view of project access road, upgraded for the Toquop Energy Project by widening, paving, and the addition of ditches for runoff on both sides of the road.

KOP 1: Visual Simulation

Figure 2b

TOQUOP W112002004SAC Fig_2b_AFTER.ai 11-22-2002sbm

CH2MHILL

Appendix I

Employment and Labor Income Multiplier Analysis Assumptions

APPENDIX I

Employment and Labor Income Multiplier Analysis Assumptions

A multiplier analysis utilizing IMPLAN PRO (Version 2) was used to generate the estimated employment and labor income impacts of the construction and operation of the Proposed Action and alternatives within the region of influence. The region of influence for the economic impact analysis is the combined regional economy of Lincoln and Clark counties in the State of Nevada. The 1998 IMPLAN data set for these two counties was used, without modifications to any study area data. A type Social Accounting Matrix (SAM) model was constructed, providing the multipliers used in the impact analysis.

Two industrial sectors were used in the analysis: one to estimate the impacts of construction activities; and a second to estimate the impacts of the operation of the facilities of the Proposed Action and alternatives. To estimate the total effects of construction employment IMPLAN *Sector 50: New Utility Structures* was used. The activities associated with the construction of the power plant, access road, wellfield, and water pipeline under all alternatives would fall within major SIC Industry Codes 15 and 16. Within the IMPLAN sector scheme, these SIC industries are matched with the IMPLAN Construction Sectors 48 to 56. Sector 50 was chosen from these potential IMPLAN sectors because this sector most closely describes the activities anticipated to occur during the construction phase of the Proposed Action or alternatives.

To estimate the effects on the regional economy of the operation of a power plant associated with the Proposed Action or alternatives, IMPLAN *Sector 443: Electric Services* was used. The operation of a natural gas-fired electrical power generation facility would fall within SIC code 4911 Electric Services. In the IMPLAN sector scheme report, the SIC industry 4910 matches with IMPLAN *Sector 443: Electric Services.* Part of the SIC industry 4910 also appears within the IMPLAN *Sectors 511: State and Local Electrical Utilities* and *514: Federal Electrical Utilities* that are both government sectors. In this analysis, IMPLAN Sector 443 was used because it matches directly with SIC industry 4910, and the facilities operated under the Proposed Action or alternatives would be privately owned. In addition, the multipliers for Sector 443 are somewhat lower than those of Sector 511, the next most logical sector choice. This selection provided a more conservative estimate of the potential beneficial effects of the Proposed Action or alternatives.

Tables F-1 and F-2 show the employment and labor income multiplier report information for the two industries used in the analysis.

TABLE F-1
Employment Multipliers for Selected IMPLAN Sectors

	Description	Type I Multiplier	Type SAM Multiplier
50	New Utility Structures	1.354757	1.748312
443	Electric Services	1.452192	2.036772

TABLE F-2
Labor Income Multipliers for Selected IMPLAN Sectors

	Description	Type I Multiplier	Type SAM Multiplier
50	New Utility Structures	1.238188	1.461733
443	Electric Services	1.264988	1.493389

In generating the indirect and induced employment and labor income effects for the analysis, the estimated direct employment and labor payroll information provided by Toquop Energy was used as the direct effects. The information is shown in Table F-3 below. Although the construction costs for Alternative 2 are somewhat different than those for the Proposed Action and Alternative 1, Toquop Energy has indicated that the labor force and payroll requirements would be the same. As such, the direct and, therefore, indirect and induced employment and labor income effects would be the same for the Proposed Action and both alternatives.

TABLE F-3
Assumed Direct Employment and Labor Income Effects

Project Phase	Average Annual Employment	Annual Labor Income
Construction	500	34 million
Operations	25	2.5 million

Source: Toquop Energy

Appendix J
Comments and Responses on the DEIS

Comments and Responses for Author - Federal Agencies

Comments and Responses for Author - Federal Agencies 1
Letter - F1. Signatory - Lisa B. Hanf. (U.S. Environmental Protection Agency) 3
Letter - F2. Signatory - Trish Riley. (U.S. Geological Survey) 16
Letter - F3. Signatory - Grady L. McNure. (Corps of Engineers, Sacramento District) 17

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

August 28, 2002

BUREAU OF LAND MG...
ELY, NEVADA
RECEIVED

	OFFICE	INIT	DATE
	DM		
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	FIRE		
	CF		

Concord

Mr. Gene A. Kolkman, Field Manager
Bureau of Land Management
Ely Field Office
HC 33, Box 33500
Ely, Nevada 89301-9408

Dear Mr. Kolkman:

The Environmental Protection Agency (EPA) has reviewed the Bureau of Land Management's (BLM) Draft Environmental Impact Statement (DEIS) for the **Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement for the Toquop Energy Project** (CEQ #020210). Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act.

BLM has developed this document in response to a proposal by Toquop Energy, Inc. (Toquop Energy) to construct and operate a 1,110-megawatt (MW) natural gas-fired electric power generating plant. The plant and its associated features would be located on lands in Lincoln County, Nevada, which are currently managed by the Ely Field Office of BLM. The document evaluates potential environmental effects associated with the construction and operation of the generating plant including necessary connections to natural gas, electric transmission, water and site access facilities. These connections would require Rights-of-Way (ROWs) from BLM. The document also evaluates the effects of amending the Caliente Management Framework Plan (MFP) to enable the exchange of a private parcel of land owned by the Nevada Land and Resource Company, LLC (NLRC). The NLRC parcel is located in the Pah Rah Range, Washoe County, NV. This parcel would be exchanged for a federally managed parcel of land where the Toquop Energy Center would be located. Toquop Energy would then acquire the plant site from NLRC.

A proposed action and two alternatives were evaluated by BLM. The proposed action, identified as BLM's preferred alternative, includes the following components:

- Amend the Caliente MFP to allow for disposal of land in Toquop area
- Exchange BLM-managed public lands for a privately owned parcel to place the proposed plant site into private ownership.
- Issue of ROWs by BLM for Toquop Energy Project construction and operation.

Letter - F1. Signatory - Lisa B. Hanf. (U.S. Environmental Protection Agency)

- Construct and operate a 1,110-MW combined cycle, natural gas-fired electric generating plant, with connections to a natural gas pipeline and electric transmission lines.
- Drill up to an estimated 15 wells in the Tule Desert Basin over the life of the project to produce an annual average flow of 3,800 gallons per minute of water for the power plant. Estimated use is up to 7,000 acre-feet of water per year.
- Construct and operate a 12.5 mile-long, 24-inch diameter buried pipeline from the wellfield in Tule Desert to the plant site.
- Construct and operate a manifold collection system to connect a wellfield water output to a pressure-regulating water tank.
- Construct and operate buried electric distribution power lines from the power plant to the well pumps.
- Pave and widen an existing dirt and gravel road to 24-feet, to provide for a 14.4-mile access road extending from I-15 to the plant.
- Provide a 12.5-mile long access right-of-way along an existing dirt and gravel road for maintenance activities between the power plant and the wellfield.

Alternative I differs from the proposed action in the location of the utility alignment. Alternative I proposes an eastern alignment of utilities from the plant site to the wellfield whereas the proposed action follows a western alignment from the plant site to the wellfield.

Alternative II differs from the proposed action and Alternative I in that the BLM managed parcel of land, which would be exchanged for the privately owned Pah Rah parcel, is located north of the proposed site and within the Tule Desert. Alternative II would require similar ROWs but connections to the pipeline, transmission lines, and the wellfield would differ in location and length.

The no action alternative would not involve a land exchange and therefore would not require an amendment to the Caliente Management Plan Framework. The proposed Toquop Energy Project would not be constructed on currently managed BLM lands.

EPA advocates an energy development approach which assures a long-term, sustainable balance between available energy supplies, energy demand, and protection of ecosystems and human health. EPA believes that the goals of providing additional energy supplies, aggressive energy conservation, and diversification of energy supply sources should be carefully balanced.

Consequently, we have several concerns about impacts of the proposed project due to a lack of some critical information in the DEIS. As such, we have rated this DEIS as category EC-2, Environmental Concerns - Insufficient Information (see attached "Summary of EPA Rating System"). In particular, we are concerned about impacts to air and water quality, and cumulative impacts. We are also concerned about the limited information provided to support the purpose and need for this project, and the narrow range of alternatives that were considered. Our detailed comments are attached.

We appreciate the opportunity to review this DEIS. Please send two copies of the Final EIS to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, or wish to discuss our comments, please call Ms Shanna Draheim, of my staff, at (415) 972-3851.

Sincerely,

Lisa B. Hanf, Manager
Federal Activities Office

filename: toquop energy deis.wpd
MI#: 003726

Attachments: EPA Rating Sheet
Detailed comments

Environmental Consequences

Air Quality

F1-1 With respect to the emission limit for NOx, EPA is aware of at least five permits for large combined cycle power plants with a Best Available Control Technology (BACT) emission rate of 2.0 parts per million (ppm) averaged over one hour, and more are expected in the coming months. EPA now considers this emission rate to be presumptive BACT for Nitrogen Oxides (NOx) for combined cycle power plants of this size, unless a permit applicant can justify a higher limit based on technical or economic considerations.

F1-2 Toquop Energy's Potential for Significant Deterioration (PSD) permit application states that an oxidation catalyst for Carbon Monoxide (CO) control is not cost-effective and as stated in both the DEIS and the PSD application, the proposed CO emission limit will be 9 ppm. Several power plants that are similar to the proposed Toquop project have been permitted with BACT emission limits of 4 ppm CO, including three in Nevada (Reliant Arrow Canyon, SEMPRA Copper Mountain, and Gen West Silverhawk). If a power plant is constructed with selective catalytic reduction, the additional cost of constructing and operating an oxidation catalyst should be small, given the overall cost of the project. The $6,708.00 per ton of CO removed figure in the source's PSD permit application appears to be very high. EPA has seen cost effectiveness numbers as low as $500.00 per ton of CO removed using an oxidation catalyst.

F1-3 The installation of an oxidation catalyst for CO control would also provide additional environmental benefits. In addition to reducing CO emissions, catalytic oxidation reduces emissions of volatile organic compounds (VOC), including VOCs that are also hazardous air pollutants (HAP). Under the PSD program, the BACT analysis must include an analysis of other environmental impacts associated with all possible emission control strategies. Since the power plant will be a major source of HAPs, the use of catalytic oxidation would be a significant benefit in protecting human health and the environment because emissions of VOC HAPs would be reduced

Water Resources

F1-4 The proposed action and Alternatives I and II could impact several major dry washes that are classified as waters of the U.S. and State waters. Therefore, BLM will need to consult with the U.S. Army Corps of Engineers (COE) and the Nevada Division of Environmental Protection (NDEP) regarding potential impacts to these waters. EPA recommends that the Final EIS describe the status of consultations with the COE and the state regarding permits necessary for constructing trenches and culverts, filling and re-routing an existing wash, and other activities that would potentially affect ephemeral streams. The Final EIS should also disclose whether a wetland delineation has been conducted. Of particular concern is the Toquop Wash and its

Response to Comment F1-1

While a number of recent projects have been permitted with NO_x emission limits of 2.0 parts per million by volume on a dry basis (ppmvd) @ 15% O_2, most were located in ozone nonattainment areas, near environmentally sensitive areas which necessitated extremely low limits to avoid undesirable impacts on air quality related values (AQRV's), or were based on limits requested in order to obtain "synthetic minor" status for projects. Few of the 2.0 ppmvd limits were based on one-hour averaging periods. Few of the projects have actually been constructed, and none have sufficient long-term operating history to demonstrate that the limits are achievable on a consistent basis. Furthermore, use of duct burners contributes significantly to uncontrolled NO_x emissions, so direct comparison of selective catalytic reduction (SCR) control on combined cycle projects cannot be made without considering duct burner sizing.

A review of the Environmental Protection Agency's (EPA's) RBLC database for projects permitted in 2002 shows a total of twenty gas fired combined cycle or cogeneration projects with NO_x data provided as concentrations or mass rate per unit of fuel consumed. Of these twenty, only one project has a limit of 2.0 ppmvd @ 15% O_2; this one project was located in an ozone nonattainment area. The remaining

nineteen projects, which included both Best Available Control Technology (BACT) and LAER limits, were all permitted at limits greater than 2.0 ppmvd @ 15% O_2.

California's Bay Area Air Quality Management District (BAAQMD) and South Coast Air Quality Management District (SCAQMD) both provide BACT workbooks/technology guidelines on their webpage. Based on ozone nonattainment issues in these areas, both districts would be expected to require state of the art NO_x controls, and furthermore California BACT does not include the same economic considerations as federal BACT, yet for one hour averaging periods, both districts are still recommending that BACT be set to 2.5 ppmvd @ 15% O_2.

A likely reason that most recent combined cycle projects have been permitted with limits of higher than 2.0 ppmvd @ 15% O_2 is the expected difficulty in maintaining consistent compliance. The margin for error in continuous emission monitoring systems (CEMS), ammonia interference with measurements, issues regarding NO_x adsorption/desorption in sampling systems, and problems associated with transient loading of turbines make it unlikely that these facilities could consistently meet a limit of 2.0 ppmvd @ 15% O_2. Each of these issues is addressed further below.

The anticipated measurement errors, associated with the CEMS that would be used to monitor NO_x emissions, would seriously inhibit the ability of Toquop Energy LLC to document compliance with a limit of 2.0 ppmvd @ 15% O_2. Mr. Fostin Curtiss of the Emission Measurement Center of USEPA was recently contacted in inquiry about anticipated CEMS accuracy in low concentration NO_x measurements. Mr. Curtiss responded that EPA was aware of accuracy issues, but as of yet was unable to quantify the CEMS inaccuracy. In a series of letters between the American Society of Mechanical Engineers (ASME) and the SCAQMD, the ASME indicated their concurrence with a recent paper authored by Mr. Wilfred Hung of Solar Turbines (Hung, 1998), which indicated that low level NO_x inaccuracies could be as large as +-6 ppm. SCAQMD, in a May 26, 1998, response letter by Anuporn Ganguli, PhD., Senior Manager of the Stationary Source Compliance Group to Mr. Steve Weinman of ASME, indicated that they disagreed with Mr. Hung's estimate, but believed that, "At the measurement levels of interest, the accuracy of measurement is most likely +- 1 ppmv NO_x."

A recent paper produced by Midwest Research Institute and Research Triangle Institute under agreement with EPA (MRI, 2000) confirms this estimated CEMS inaccuracy. The intent of this paper is to provide verification of the expected efficiency of various control techniques, as confirmed by empirical data. Page 5 of that document specifies that the data quality objectives for measurement of effluents of 2 ppm or less include an expected +-50% error, and thus is in agreement with SCAQMD's analysis. (Tests would be based on Method 7E, which is similar to the technology used in NO_x CEMS.)

Ammonia interference is a known problem with NO_x CEMS used on SCR exhaust. Ammonia can be converted to NO when a high-temperature NO_2 to NO converter is used in a NO_x analyzer. While much of the ammonia would be expected to be removed in the water bath of a NO_x CEMS, conversion of even a tiny fraction of the ammonia slip from an SCR system can produce significant measurement errors where extremely low NO_x limits are required.

Some CEMS vendors have also recently been studying NO_x adsorption/desorption problems with low level NO_x measurements. Based on actual experience with CEMS calibration checks, it has been concluded that NO_x can be adsorbed in a portion of the sample transport or sample conditioning systems during periods of high NO_x emissions such as turbine startup, and is later desorbed by the system during periods of lower NO_x emissions. The ammonia scrubber typically used on the CEMS (but not on the reference method used for CEMS relative accuracy checks) for protection of the equipment is suspected as causing the problem. The exact measurement error has not yet been quantified. However, since any such desorption would depend primarily on the concentration of NO_x during startup

and thus would produce errors of equal magnitude regardless of the NO_X limit, the error would represent a larger percentage of a lower NO_X limit, and would thus represent a more significant problem for a NO_X limit of 2.0 ppmvd @ 15% O_2.

Turbine NO_X emissions are guaranteed by turbine vendors under only steady-state operating conditions. During periods of transient loading, uncontrolled emissions can increase. A higher percentage of NO_X removal is thus required in order to meet short-term emission limits.

Given CEMS inaccuracies of up to 1 ppm, another normal operations "contingency" of 0.5 ppm to cover ammonia interference, NO_X adsorption/desorption problems, and transient turbine loading, facility operators would need to have a routine operating target of 0.5 ppmvd @ 15% O_2 in order to consistently demonstrate compliance with a 2.0 ppmvd @ 15% O_2 limit. This target may be infeasible in practice.

Given the severe penalties that could result in noncompliance with NO_X limits, facility operators frequently overfeed ammonia in order to ensure compliance. Measured NO_X values from a number of operating facilities, cited in a paper by RMB Consulting (McRanie, 2002), reinforces this conclusion, "Another interesting observation is that the data have been given a 'flattop' just below the compliance level. This indicated that a source's response to approaching the limit is to increase NH_3 feed to the SCR."

Larger catalyst beds, with increased pressure drop, are required to meet lower NO_X limits. As a consequence, power plant efficiency is lower, and catalyst production and landfill disposal increase with lower NO_X limits. While these are minor considerations, both represent additional negative environmental consequences associated with lower NO_X limits.

Given that the CEMS inaccuracy could be as high as 50% of a low NO_X limit, issues regarding NO_X adsorption/desorption and ammonia interference, and difficulty in meeting permit limits during transient turbine operation, a limit of 2.0 ppmvd @ 15% O_2 would create significant risks of noncompliance for the Toquop Energy Project. Negative environmental consequences could also result. The proposed Toquop Energy Project limit of 2.5 ppmvd @ 15% O_2 is more stringent than most recently permitted projects in the United States, and represents a responsible, aggressive pollution reduction target.

References:

Hung, 1998. "Uncertainty in Gas Turbine NO_X Emission Measurements", Wilfred S. Y. Hung and Alan Campbell, Solar Turbines Incorporated, http://energypubs.com/Features.cfm?catid=5&cmd=lookup&fid=221

MRI, 2000. "Environmental Technology Verification Protocol-NO_X Control Technologies for Stationary Combustion Sources", prepared by Midwest Research Institute and Research Triangle Institute Under a Cooperative Agreement with USEPA, August 1000.

McRanie, 2002. "Low Level NO_X Measurements and Related Compliance Issues on Gas Turbine Combined Cycle Units", Richard D. McRanie, RMB Consulting and Research, http://rmb-consulting.com/san/lownox.htm

Response to Comment F1-2

The Toquop Energy Project will be located in an area that is in full attainment of the ambient air quality standards for carbon monoxide (CO). As demonstrated by the dispersion modeling submitted with the air permit application, the highest reasonable but conservative CO impact of the Toquop Energy Project (for either 1-hour or 8-hour averaging periods) would be only 17% of the Prevention of Significant Deterioration (PSD) modeling significance level. Thus, the Toquop Energy Project would create an insignificant change in ambient CO concentrations in the area.

Given the proximity of the Arrow Canyon, Copper Mountain, and Silverhawk projects to the Clark County CO nonattainment area, use of oxidation catalyst on those projects is perhaps more justified. Furthermore, at least one project, Arrow Canyon, was proposed with Westinghouse 501D turbines, which have CO emissions nearly three times higher than that of the GE 7FA turbines proposed for the Toquop Energy Project.

BACT is an emission limitation based on the maximum degree of reduction for each pollutant, on a case-by-case basis, taking into account technical feasibility, energy, and environmental impacts. Therefore, BACT for the Clark County projects is not necessarily the same as BACT for the Toquop Energy Project.

The cost effectiveness, calculated for use of oxidation catalyst to control CO for the Toquop Energy Project, was based on manufacturer's quoted capital, maintenance, and operations costs. CO removal was based on reduction of the combined turbine / duct burner exhaust to an anticipated target concentration of 3.0 ppmvd @ 15% O_2 of CO. Use of oxidation catalyst to control Toquop Energy Project CO emissions was demonstrated to be not cost effective.

Response to Comment F1-3

The use of an oxidation catalyst would reduce emissions of hazardous air pollutants (HAPs). However, as demonstrated in the air permit application and Table 4-4 of the DEIS, the TEF would not be a "major source" of HAPs.

The Toquop Energy Project would utilize General Electric (GE) 7FA turbines with GE's DLN 2.6 combustor. These combustors are of the lean premix type through the entire sequence of startup and normal operations. As indicated by Mr. Sims Roy of the Emission Standards Division of EPA in a 2001 technology memorandum (Roy, 2001) and in the May 20, 2002, teleconference on combustion turbine MACT, use of lean premix combustors achieve an equivalent HAP reduction as would the use of oxidation catalyst on a turbine with diffusion flame combustors. HAP emissions from the Toquop Energy Project are already an order of magnitude lower, on a per-megawatt basis, than many comparable projects in the region.

References:

Roy, 2001. "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines", Sims Roy, USEPA Office of Air Quality Planning and Standards, August 21, 2001, http://www.epa.gov/ttn/atw/combust/turbine/turbpg.html

Response to Comment F1-4

Chapter 5 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* reflects the status of consultation with the USACE and the State of Nevada.

In Comment Letter F3 on the DEIS, the USACE provided the BLM with guidance on the Department of the Army dredge and fill permit that will be required for discharges to Waters of the United States and advises that the project proponent avoid and minimize any adverse impacts to waters of the United States to the maximum extent practicable and to compensate for any permanent losses. State of Nevada comments on permits and potential effects associated with the proposed project are contained in Comment Letters S1, S2, S3, and S4.

F1-4 tributaries which flow into the Virgin River. Toquop and its tributaries may receive greater nonpoint source pollution from impervious surfaces associated with the plant site and paved access road during storm events.

Biological Resources/Threatened and Endangered Species

F1-5 EPA commends BLM for the comprehensive list of measures to be implemented during project construction, operation and maintenance to avoid and reduce impacts to the desert tortoise. We recommend that *all workers* associated with the project be instructed on these measures and other standard operating procedures to avoid any potential harm to the species

Cumulative Impacts

Well prepared cumulative impacts analyses are of increasing importance to EPA as they describe the threats and benefits to resources as a whole. Understanding these cumulative impacts can illuminate opportunities for minimizing those threats and highlighting benefits. The DEIS provides insufficient information on other on-going, planned, and reasonably foreseeable projects in the study area that may contribute to cumulative impacts. The list of interrelated projects identified in Chapter 1, Section 1.8 are not sufficiently described in order to make an informed evaluation of potential cumulative impacts that the proposed project may have. We recommend that the Final EIS:

F1-6 - focus on resources of concern – those resources that are "at risk" and/or are significantly impacted by the proposed project, before mitigation. The Cumulative Impacts section should identify which resources are analyzed, which ones are not, and why.

F1-7 - describe in sufficient detail other interrelated projects. Where studies exist on the environmental impacts of these other projects, such as county comprehensive plans or other EISs, use these studies as a source for quantifying cumulative impacts.

F1-8 EPA recommends that a separate Cumulative Impact Section be included in the Final EIS. This would enable the reviewer and project proponent to better evaluate the cumulative impacts of the project. The intent of such analysis is to provide a comprehensive evaluation of impacts both in time and space that this action, in concert with other actions, may have on resources of concern.

Purpose and Need

A DEIS should include a clear description of the project's purpose and need. Adequately defining the purpose and need of any proposed federal project is a critical element of an EIS. It

Response to Comment F1-5

Comment noted.

Response to Comment F1-6

Which resources were analyzed, which were not, and why, have been identified in the new *Cumulative Impacts* section of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* (Section 4.18),

Response to Comment F1-7

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* (Section 1.8, *Interrelated Projects*) expands the description of interrelated projects.

Response to Comment F1-8

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* includes a separate Cumulative Impacts section (Section 4.18).

should not simply state what a project will be or how it will work, it should lay out why the existing situation warrants a change. A clearly identified purpose and need sets the stage for thorough consideration of a range of alternatives.

The DEIS states that the proposed Toquop Energy Project would generate electrical power at competitive costs to ease power shortages (near- and long-term) in the western United States. The project would contribute to meeting the power demand for the Las Vegas, NV area and to meeting the capacity and energy requirements for the Arizona-New Mexico-southern Nevada power area. In addition, the purpose and need discussion alludes to potential economic benefits derived from the land exchange (tax base increases), plant construction and operation, employment opportunities, and increased revenues from project-related purchases.

F1-9 EPA recommends that the purpose and need discussion include information about current and projected energy demands for the proposed service area and the degree to which the Toquop Energy project would contribute to the projected demand and capacity requirements for the Las Vegas area and the Arizona-New Mexico-southern Nevada power area.

F1-10 In addition, the Final EIS would benefit from additional information for the Purpose and Need section responding to the stated economic need in Lincoln County. It is important to note that the land exchange is a separate action from the Toquop Energy Project and could proceed in the absence of the proposed energy project. Conversely, the Toquop Energy Project could proceed (on BLM managed lands) in the absence of the land exchange. Therefore, care should be taken to avoid linking economic benefits from the sale of the land/land exchange and those from plant construction and operation as it relates to Lincoln and/or Clark County.

Alternatives

CEQ Regulations for implementing NEPA (40 CFR, Parts 1500 - 1508) state that the alternatives section of an EIS should "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly describe the reasons for their having been eliminated" (40 CFR, part 1502.14).

The DEIS presents three alternatives and a no-action scenario. The proposed action and Alternative I are virtually identical except for location of the water pipeline. Alternative II differs in the location of the plant site and subsequent location of the water pipeline and transmission

F1-11 lines. The similarities among the alternatives provide a very narrow range of options for decision makers to evaluate the proposed project.

F1-12 The DEIS does identify several alternatives which were eliminated from further evaluation because they did not meet the project's Purpose and Need. The DEIS included a short discussion of some of the reasons for their elimination. However, the DEIS did not identify a clear set of criteria to be used to screen all alternatives in a similar manner. Although each

Response to Comment F1-9

The Purpose and Need (Sections 1.2 and 1.3) quantify the project's contribution to overall power demand for the Las Vegas area and the Arizona-New Mexico-Southern Nevada power area.

Response to Comment F1-10

The Purpose and Need (Sections 1.2 and 1.3) provides additional information regarding the economic need of Lincoln County.

Information addressing the current economic status and benefits to Lincoln County of the power plant is presented in Sections 3.16.1 and 4.16.1 respectively of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*. The tax base generated by the Toquop Energy Project would have a significant beneficial impact on Lincoln County during both the construction and operational phases (please see Section 4.16.1 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* for a detailed discussion of these impacts). Section 4.16.1 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* describes the benefits to Lincoln County of the land exchange.

Response to Comment F1-11

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

Response to Comment F1-12

Section 2.7 (*Alternatives Considered During Scoping but Eliminated from Further Consideration*) of the DEIS provides the rationale for why various alternative project components were not analyzed in detail, including but not limited to alternative project locations (Section 2.7.2) and an alternative access road location (Section 2.7.3). These particular alternative project formulations were eliminated because they would not meet project Purpose and Need for one or more of the following reasons: would cause unacceptable environmental impacts, would cause greater environmental impacts than alternatives analyzed in detail, would be restrictive because of their high costs, and would not provide economic benefits to communities in and near Lincoln County.

In support of the alternatives selected for detailed analysis, Council on Environmental Quality (CEQ) guidelines require that federal agencies rigorously explore and objectively evaluate all "reasonable" alternatives and not disregard the "common sense realities" of a given situation in the development of alternatives. Agencies should seek a reasonable range of practical and feasible alternatives that will accomplish project objectives (i.e., best meet project Purpose and Need). The Proposed Action and Alternatives 1 and 2 described and evaluated in the DEIS were determined to best meet these criteria. An option under each that was addressed in the DEIS would be for the land exchange to not occur. Instead, the proposed project would be constructed and operated on land that would continue to be administered by the BLM.

F1-12 alternative was described and a qualitative reason for elimination was provided, there was a lack of consistency in the reasons why each alternative was eliminated. Acknowledging that the purpose and need for the proposed project is based on cost effective power generation, we recommend that the analysis consider short-term versus long-term costs and benefits over the operating life of the plant.

For example, the DEIS identifies an air-cooled system as an alternative method of cooling the proposed power plant. An air-cooled system would utilize much less water than the applicant's preferred wet-cool option, and would have fewer emissions of particulates (PM_{10}). Power plants in the arid southern California and northern Mexico region have been developed using an air-cooled design to address these issues. The air-cooled system was eliminated from further consideration for the stated reasons of decreased plant efficiency, increased air emissions, increased capital and operating costs making the project non-competitive in the marketplace.

F1-13 EPA recommends that a comparative analysis be conducted to compare wet-cooled and air-cooled systems to support the reasons for eliminating the air-cooled system alternative from further consideration. Furthermore, we recommend that additional quantitative data be included

F1-14 in Final EIS which better supports the decisions to eliminate alternatives advocating alternative fuel use (e.g., solar).

Response to Comment F1-13

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

Response to Comment F1-14

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* (*Section 2.7.1*) provides additional quantitative data regarding alternative fuel uses.

SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment"

Gene Kolkman
07/30/2002 09:46 AM

To: Jeff Weeks/EYFO/NV/BLM/DOI@BLM
cc:
Subject: Draft EIS, Toquop Energy Project

---- Forwarded by Gene Kolkman/EYFO/NV/BLM/DOI on 07/30/02 10:46 AM ----

Patricia E Riley@USGS
07/29/02 09:51 AM

To: Gene Kolkman/EYFO/NV/BLM/DOI@BLM
cc:
Subject: Draft EIS, Toquop Energy Project

Gene.

F2-1 USGS has reviewed the subject Draft EIS/MFP and has no comments to offer.

Thanks.

Trish Riley
U.S. Geological Survey
423 National Center
Reston, VA 20192
703.648.6822

Letter - F2. Signatory - Trish Riley. (U.S. Geological Survey)

Response to Comment F2-1

Comment noted.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO ATTENTION OF

July 29, 2002

BUREAU OF LAND MGMT
ELY, NEVADA
RECEIVED

AT	OFFICE	INIT	DATE
✓	DM		
	RR		
✓	NRR		
	SS		
	CAI		
	FIRE		
	C.F.		

Regulatory Branch (200250284)

Mr. Gene A. Kolkman, Field Manager
U.S. Bureau of Land Management
Ely Field Office
HC 33, Box 33500
Ely, Nevada 89301-9408

Dear Mr. Kolkman:

This responds to the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement (EIS) for the Toquop Energy Project dated May 20, 2002. The project involves the construction of an 1,100-megawatt natural gas-fired, water-cooled electric power generating plant and associated features on public lands in Lincoln and Clark counties, Nevada.

In accordance with Section 404 of the Clean Water Act, the Corps of Engineers regulates the discharge (placement) of dredged and fill material in waters of the U.S., including wetlands and perennial, intermittent and ephemeral streams. A Department of the Army permit is the approving instrument for such discharges. Examples of activities requiring a Department of the Army permit include, but are not limited to, road crossings, utility line crossings, and commercial physical plant sites. The Sacramento District administers the regulatory permit program in Nevada.

F3-1

The proponent or responsible party should be advised to obtain the necessary permit from the Corps of Engineers before beginning any activity involving a regulated discharge of dredged and fill material in waters of the U.S. For more information, please access our website at:

http://www.spk.usace.army.mil/cespk-co/regulatory

Please pay special attention to our nationwide general permit program.

For additional information about delineating ephemeral streams, refer to:

http://www.spl.usace.army.mil/regulatory/jd_guide.pdf

Generally speaking, a "bed and bank" and a surface connection of this channel to other waters of the U.S. are needed to demonstrate jurisdiction. However, this website document offers

Letter - F3. Signatory - Grady L. McNure. (Corps of Engineers, Sacramento District)

Response to Comment F3-1

Comment noted.

additional guidance for determining jurisdiction of ephemeral streams.

F3-2 We request that your agency include the Corps of Engineers, Sacramento District as a designated cooperating agency under Council on Environmental Quality guidelines. We expect to use your EIS to satisfy our National Environmental Policy Act requirements for any Department of the Army permit application.

F3-3 We also advise that the proponent avoid and minimize any adverse impacts to waters of the U.S. to the maximum extent practicable and compensate for any permanent losses. We suggest close examination of our evaluation criteria, the Section 404(b)(1) guidelines, promulgated by the U.S. Environmental Protection Agency.

Please refer to number **200250284** in any future correspondence with the Sacramento District concerning this project. If you have any questions, please contact me at e-mail address, **Grady.McNure@usace.army.mil**, or telephone number (435) 986-3979.

Sincerely,

Grady L. McNure
Chief, St. George Regulatory Office
321 North Mall Drive, Suite L-101
St. George, Utah 84790-7310

Copy Furnished:

Ms. Kathleen Dadey, U.S. Environmental Protection Agency, Region IX, 75 Hawthorne Street, San Francisco, California 94105-3901

Response to Comment F3-2

The USACE has been added as a cooperating agency.

Response to Comment F3-3

Comment noted.

Comments and Responses for State Agencies

Comments and Responses for State Agencies **1**
Letter - S1. Signatory - Carl Barrick. (Nevada State Department of Water Resources)..... 3
Letter - S2. Signatory - Joesph M. Del Grosso. (Nevada Division of State Lands)..... 4
Letter - S3. Signatory - Rebecca L. Palmer. (Nevado State Historic Preservation Office) 5
Letter - S4. Signatory - Doug Hunt. (Department of Conservation and Natural Resources)..... 6

NEVADA STATE CLEARINGHOUSE

Department of Administration
Budget and Planning Division
209 East Musser Street., Room 200
Carson City, Nevada 89701-4298
(775) 684-0209
Fax (775) 684-0260

DATE: June 4, 2002

Governor's Office	Legislative Counsel Bureau	Conservation Natural Resources
Agency for Nuclear Projects	Information Technology	Director's Office
Agriculture	Emp. Training & Rehab Research Div.	State Lands
Business & Industry	PUC	Environmental Protection
Energy	Transportation	Forestry
Minerals	UNR Bureau of Mines	Wildlife
Economic Development	UNR Library	Region 1
Tourism	UNLV Library	Region 2
Fire Marshal	Historic Preservation	Region 3
Human Resources	Emergency Management	Conservation Districts
Aging Services	Office of the Attorney General	State Parks
Health Division	Washington Office	Water Resources
Indian Commission	Nevada Assoc. of Counties	Natural Heritage
Colorado River Commission	Nevada League of Cities	Wild Horse Commission

Nevada SAI # E2002-178
Project: Draft Toquop Land Disposal Amendment to the Clients Management Framework Plan and DEIS for the Toquop Energy Project

[redacted]

CLEARINGHOUSE NOTES:
Enclosed, for your review and comment, is a copy of the above mentioned project. Please evaluate it with respect to its effect on your plans and programs, the importance of its contribution to state and/or local areawide goals and objectives, and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than August 23, 2002. Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Heather Elliott, 684-0209

THIS SECTION TO BE COMPLETED BY REVIEW AGENCY

___No comment on this project
___Proposal supported as written
___Additional information below
___Conference desired (See below)
___Conditional support (See below)
___Disapproval (Explain below)

AGENCY COMMENTS: Same comment as E2002-170

S1-1 Lincoln County has applications for water rights on file in the State Engineer's Office for the Toquop project. No decision has been made on these applications, however, they have been through the administrative hearing process. All waters of the State belong to the public and may be appropriated for beneficial use under the provisions of Nevada Revised Statutes (NRS) § Chapters 533 and 534 and not otherwise. Any water used for construction, dust control, and project operations should be provided by an established utility or under permits or waivers issued by the State Engineer under provisions of the Nevada Revised Statutes. All water wells, monitor wells, or boreholes existing, drilled, or utilized at the Toquop project or Pah Rah lands are the ultimate responsibility of the owner of the property and must be constructed, and plugged and abandoned in compliance with the Nevada Administrative Code Chapter 534. If artesian water is encountered in any well or borehole it shall be controlled as required by NRS 534.060(3).

Signature: Carl Barrick — CARL BARRICK, Water Resources Administrator
Agency: WATER RESOURCES
Date: 06-07-02

Letter - S1. Signatory - Carl Barrick. (Nevada State Department of Water Resources)

Response to Comment S1-1

Comment noted.

NEVADA STATE CLEARINGHOUSE
Department of Administration
Budget and Planning Division
209 East Musser Street, Room 200
Carson City, Nevada 89701-4298
(775) 684-0209
Fax (775) 684-0260

2002 JAN -5 A9:40

STATE LANDS
DIVISION OF

DATE: June 4, 2002

Governor's Office	Legislative Counsel Bureau	Conservation-Natural Resources
Agency for Nuclear Projects	Information Technology	Director's Office
Agriculture	Emp. Training & Rehab Research Div	State Lands
Business & Industry	PUC	Environmental Protection
Energy	Transportation	Forestry
Minerals	UNR Bureau of Mines	Wildlife
Economic Development	UNR Library	Region 1
Tourism	UNLV Library	Region 2
Fire Marshal	Historic Preservation	Region 3
Human Resources	Emergency Management	Conservation Districts
Aging Services	Office of the Attorney General	State Parks
Health Division	Washington Office	Water Resources
Indian Commission	Nevada Assoc. of Counties	Natural Heritage
Colorado River Commission	Nevada League of Cities	Wild Horse Commission

Nevada SAI # E2002-178
Project: Draft Toquop Land Disposal Amendment to the Clients Management Framework Plan and DEIS for the Toquop Energy Project

[redacted]

CLEARINGHOUSE NOTES
Enclosed, for your review and comment, is a copy of the above mentioned project. Please evaluate it with respect to its effect on your plans and programs, the importance of its contribution to state and/or local areawide goals and objectives, and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than August 23, 2002. Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Heather Elliott, 684-0209.

THIS SECTION TO BE COMPLETED BY REVIEW AGENCY

___No comment on this project
X Proposal supported as written
___Additional information below
___Conference desired (See below)
___Conditional support (See below)
___Disapproval (Explain below)

AGENCY COMMENTS:

Our analysis of the project leads us to concur that the proposed action is the most feasible and has the least potential for adverse environmental impacts.

Signature — Agency: STATE LANDS — Date: 6.27.02

Letter - S2. Signatory - Joesph M. Del Grosso. (Nevada Division of State Lands)

Response to Comment S2-1

Comment noted.

8/20

NEVADA STATE CLEARINGHOUSE
Department of Administration
Budget and Planning Division
209 East Musser Street., Room 200
Carson City, Nevada 89701-4298
(775) 684-0209
Fax (775) 684-0260

JUN 04 20

State Historic Preservation Office

DATE: June 4, 2002

Governor's Office	Legislative Counsel Bureau	Conservation/Natural Resources
Agency for Nuclear Projects	Information Technology	Director's Office
Agriculture	Emp. Training & Rehab Research Div.	State Lands
Business & Industry	PUC	Environmental Protection
Energy	Transportation	Forestry
Minerals	UNR Bureau of Mines	Wildlife
Economic Development	UNR Library	Region 1
Tourism	UNLV Library	Region 2
Fire Marshal	Historic Preservation	Region 3
Human Resources	Emergency Management	Conservation Districts
Aging Services	Office of the Attorney General	State Parks
Health Division	Washington Office	Water Resources
Indian Commission	Nevada Assoc. of Counties	Natural Heritage
Colorado River Commission	Nevada League of Cities	Wild Horse Commission

Nevada SAI # E2002-178
Project: Draft Toquop Land Disposal Amendment to the Clients Management Framework Plan and DEIS for the Toquop Energy Project

[redacted]

CLEARINGHOUSE NOTES:
Enclosed, for your review and comment, is a copy of the above mentioned project. Please evaluate it with respect to its effect on your plans and programs, the importance of its contribution to state and/or local areawide goals and objectives; and its accord with any applicable laws, orders or regulations with which you are familiar.

Please submit your comments no later than August 23, 2002. Use the space below for short comments. If significant comments are provided, please use agency letterhead and include the Nevada SAI number and comment due date for our reference. Questions? Heather Elliott, 684-0209.

THIS SECTION TO BE COMPLETED BY REVIEW AGENCY:

- ___No comment on this project
- ✓ Proposal supported as written
- ___Additional information below
- ___Conference desired (See below)
- ___Conditional support (See below)
- ___Disapproval (Explain below)

AGENCY COMMENTS:

Rebecca L Palmer
Signature

Historic Preservation 8/14/02
Agency Date

TOTAL P.15

Letter - S3. Signatory - Rebecca L. Palmer. (Nevado State Historic Preservation Office)

Response to Comment S3-1

Comment noted.

KENNY C. GUINN
Governor

STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

DIVISION OF WILDLIFE
1100 Valley Road
Reno, Nevada 89512
(775) 688-1500 • Fax (775) 688-1595

R. MICHAEL TURNIPSEED, PE
Director

[illegible] Department of Conservation
ELY, NEVADA
TERRY R. CRAWFORTH
Administrator

AT OFFICE	INIT	DATE
ELM		
[illegible]		
WFM		
[illegible]		
ONA		
FIRE		
CP		

August 23, 2002

Ms. Heather Elliott
Nevada State Clearinghouse
209 East Musser Street, Room 200
Carson City, NV 89701-4298

Nevada SAI#: E2002-178, Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and DEIS for the Toquop Energy Project (DEIS)

Dear Ms. Elliott:

The conceptual actions were reviewed and responded to in writing previously; the first in a letter dated September 10, 2001 sent to the BLM's Ely Field Manager concerning the Toquop Energy Power Plant EIS scoping process, and a subsequent letter dated 17 December 2001 (SAI E2002-065) sent to you regarding the NOI for an amendment to the Caliente MFP accommodating a land disposal/exchange and ROW for the Toquop Energy Power Plant. Regarding wildlife values, our comments in both letters were based on review by Division staff from our Western Region (re: Pah-Rah parcel) and Southern Region (re: Toquop parcel and Power Plant) offices. The lead office for making the responses on behalf of the entire Division rested with the Southern Region as significant concerns regarding wildlife and habitat occur in the Toquop project area.

As you may recall from our September 10, 2001 letter, we initially opposed the proposed action(s) concerning:

- Packaging the land exchange /MFP amendment as separate NEPA actions by separate BLM offices when the two were obviously inseparable,
- An illogical and non-objective comparison of wildlife values between the Pah-Rah and Toquop sites justifying the land exchange, and
- Disregard for significant wildlife concerns at and off-site of the proposed Toquop Energy location.

S4-1 We made these comments in recognition of national commitments to augment the western power grid's capabilities by the addition of production facilities in many of the western states. Over the past 3 years, 12 energy production facilities have been proposed or are under construction along the I-15/Kern River Gas Pipeline corridor, all except the proposed project are within Clark County. Cumulative impacts to wildlife habitats have yet to be adequately addressed.

We also appreciate reasonable proposals by local communities in pursuit of economic fitness. The Lincoln County Land Act provided for approximately 12,000 acres to allow growth by the City of Mesquite while making it possible for Lincoln County to increase its tax revenues. A portion of land sale revenues is available to support development of a Habitat Conservation Plan (HCP), thereby attending to federal Endangered Species Act considerations. The Division is participating in that HCP's

Letter - S4. Signatory - Doug Hunt. (Department of Conservation and Natural Resources)

Response to Comment S4-1

Section 4.5 (Biological Resources) of the DEIS described potential cumulative impacts for the following biological resources: threatened, endangered and sensitive species (specifically desert tortoises); vegetation and noxious weeds; wildlife and fisheries resources; and wetland/riparian zones, floodplains, and waters of the United States. The potential for cumulative impacts on wildlife habitat was addressed under several of these headings.

development. The Division is also participating in the Coyote Springs Investments HCP effort of which approximately 2/3 of the 43,000 acres of CSI's lands are within Lincoln County. We understand the essential need to balance biological science, economics, and politics in successful development and implementation of HCP's and similar conservation minded efforts. CSI lands occur within critical habitat for the desert tortoise, whereas the Lincoln County Land Act lands are adjacent to critical habitat, and the proposed Toquop Power Plant sites are adjacent to and pass through critical habitat.

Because of our concerns for wildlife and habitat, you may also recall our request and offer in our December 17, 2001 letter to participate on the team developing the DEIS and MFP Amendment now before us. To our knowledge, the BLM and the project proponents have demonstrated little interest in seeking clarification to any of our responses or asking for consultation with us outside of the formal NEPA process. We find this hardly a productive consultation between two governmental agencies having responsibilities for wildlife resources and inconsistent with the intent of several federal laws and regulations, including Federal Land Policy and Management Act of 1976, Fish and Wildlife Coordination Act of 1946, Sikes Act of 1973, and CFR 43, Part 24.

At our annual coordination meeting with the BLM's Ely staff last February, BLM's Jeff Weeks was evasive regarding the biological and economic inequity between the Pah-Rah and Toquop sites. More recently at the Public Meeting in Las Vegas last July 9, Southern Region biologists again reiterated Division's concerns to Jeff Weeks who once again evaded recognition of Division's previously written comments saying that BLM had yet to hear from biologists in our Western Region, and that a forthcoming response from our State Office might assure BLM's more serious attention to our responses and interest. As our Regional Offices have full authority and responsibility for site specific inputs into federal land management agency planning, this unprofessional response to Nevada Division of Wildlife staff inputs and resource concerns is unacceptable

I can assure you Division's Western Region Supervising Habitat Biologist, Roy Leach, and Area Game Biologist, Mike Dobel have relayed to the Southern Region that the Pah-Rah parcel is of little long-term value to wildlife. The parcel's native habitat components have been extensively invaded by cheatgrass following persistent fire events. The Pah-Rah Mountain's wildfire history has favored expansion of invasive plants and perpetuated a shortened fire cycle precluding shrub community establishment, especially sagebrush. Re-establishment of sagebrush communities is crucial to wildlife such as sage grouse, pronghorn, and mule deer.

Dave Buhlig, Realty Specialist assigned to the exchange project from the BLM's Carson Field Office, related his personal sightings of sage grouse, pronghorn, mule deer, and chukar at the July 9th Public Meeting. However, context of these sightings on the parcel's perimeter were not obvious. While simple use of the Pah-Rah parcel by wildlife may impart wildlife value, the true value of this parcel as wildlife habitat relates to its area contribution to the adjacent lands and the ability of its and adjacent habitats to support the *long-term persistence* of sage grouse, mule deer, pronghorn, chukar, and other wildlife populations. Our assessment finds adjacent lands are being developed at a rapid pace with communication sites, future utility corridors, a mine north of the parcel, and residential development pressing in from the west and north. Two of three sage grouse leks in the area have already been abandoned. The Division anticipates that any short-term benefit to wildlife of the Pah-Rah parcel will be eroded by the established development pattern. We cannot concur that the parcel, if acquired by the BLM, will be protected by the various procedures and processes identified in the DEIS.

S4-2

On page 1-12, under the listing of State of Nevada Permits and Approvals, the Division's role is limited to *consultation* for disturbance on BLM land. We have the following summary of additional requirements:

S4-3

Response to Comment S4-2

Comment noted.

Response to Comment S4-3

Table 1-3 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* shows that State of Nevada authorization would be required for the take or removal of the state-protected desert tortoise and banded Gila monster.

S4-3

S4-4

- Both the desert tortoise and banded Gila monster are State protected reptiles; authorization for their take or removal will be requisite in addition to any federal or local authorizations;
- Construction of cooling ponds will pose a continual hazard for migratory birds and other wildlife. The DEIS is remiss in failing to address a problem that has had significant consequences recently at other power facilities in southern Nevada. In addition to addressing federal regulations for the Migratory Bird Treaty, a State of Nevada Industrial Artificial Pond permit may be required should the evaporation ponds be chemically laden and toxic to wildlife;
- Consultation with BLM and the project proponents has yet to occur to the satisfaction of the Division.

Hence, we are compelled to request conference with the various offices of the BLM, U.S. Fish & Wildlife Service, Lincoln County, and Vidler, LLC to address outstanding issues too numerous to fully include here on the proposed actions contained in the DEIS.

Sincerely,

Doug Hunt
Chief, Habitat Bureau

DBH:dbh

cc Administrator, NDOW
NDOW, Game Bureau
NDOW, Habitat Bureau
BLM, Nevada State Office
BLM, Carson Field Office
BLM, Ely Field Office
BLM, Las Vegas Office
USFWS, Nevada State Office
USFWS, Las Vegas Sub-Office

Response to Comment S4-4

Section 4.5.4, Wildlife and Fisheries Resources, of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* includes a discussion of potential impacts of the cooling pond on wildlife

Meeting the requirements of the North America Migratory Bird Treaty Act has been included in Appendix B Standard Construction and Operations Procedures. Table 1-2 of the FEIS has been revised to include the need for a State of Nevada Industrial Artificial Pond permit.

Comments and Responses for Local Agencies

Comments and Responses for Local Agencies..... 1
Letter - L1. Signatory - Kay Brothers. (Southern Nevada Water Authority)..... 3
Letter - L2. Signatory - Michael Winters. (Virgin Valley Water District) 10

SOUTHERN NEVADA
WATER AUTHORITY

BUREAU OF LAND MGM...
ELY, NEVADA
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RT	OFFICE	INIT	DATE
	D.M		
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	C.F.		

Comments:

Administrative Office
1001 S. Valley View Blvd.
Las Vegas, Nevada 89153
Telephone: (702) 258-3939
Fax: (702) 258-3960

Project Office
1900 E. Flamingo, Ste. 170
Las Vegas, Nevada 89119
Telephone: (702) 862-3400
Fax: (702) 862-3470

Southern Nevada Water System
243 Lakeshore Road
Boulder City, NV 89005
Telephone: (702) 564-7697
Fax: (702) 564-7222

August 29, 2002

Gene A. Kolkman, Field Manager
Bureau of Land Management
Ely Field Office
HC 33, Box 33500
Ely, Nevada 89301-9408

Dear Mr. Kolkman:

SUBJECT: COMMENTS ON THE DRAFT TOQUOP LAND DISPOSAL AMENDMENT TO THE CALIENTE MANAGEMENT FRAMEWORK PLAN AND DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE TOQUOP ENERGY PROJECT

On May 20, 2002, the Bureau of Land Management (BLM) issued the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and the Draft Environmental Impact Statement (DEIS) for the Toquop Energy Project. The Southern Nevada Water Authority (Authority) is responsible for securing water resources and represents the major water and wastewater purveyors in southern Nevada, including the Las Vegas Valley Water District, the Cities of Boulder City, Henderson, Las Vegas, and North Las Vegas, the Clark County Sanitation District, and the Big Bend Water District in Laughlin. The Authority has reviewed the document and provides the following comments.

L1-1

Failure to Analyze Reasonable Range of Alternatives

The purpose and need for the project are described in the DEIS as generating electrical power at competitive costs and generating economic benefits to Lincoln County. The DEIS presents only two alternatives, which are virtually identical except for location, and the no action. This is an inadequate range of alternatives for the described purpose and need, and does not comply with the Council on Environmental Quality's (CEQ) Regulations for implementing NEPA, which require agencies to "rigorously explore and objectively evaluate all reasonable alternatives..." (40 CFR 1502.14) and "identify and assess the reasonable alternatives" (40 CFR 1500.2).

The Authority submitted comments during the scoping for this project on the need to evaluate water-efficient technologies, such as an air-cooled plant, for the proposal. The DEIS eliminates analysis of an air-cooled plant from consideration on the basis that an air-cooled plant would be non-competitive in the regional marketplace and economically unfeasible. This is untrue given that there are several air-cooled power plants in various stages of completion in the region. The Mirant Las Vegas and

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County Commissioner

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Letter - L1. Signatory - Kay Brothers. (Southern Nevada Water Authority)

Response to Comment L1-1

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

Duke Energy Mesquite facilities, both of which will have similar generating capacity to the proposed Toquop Energy Project, are air-cooled plants currently under construction in the Apex area and scheduled to be operational in 2002.

In a very recent ruling the Nevada State Engineer held that "The State Engineer ... does not believe it is prudent to use substantial quantities of newly appropriated ground water for water cooled power in one of the driest places in the nation, particularly with the uncertainty as to what quantity of water is available from the resource, if any." *See, Nevada State Engineer Ruling No. 5115* at 24-25. Thus, the range of alternatives considered in the DEIS are deficient in that none of the existing alternatives even mentions the stated policy of the State of Nevada in regard to wet-cooled power plants in this region and that no alternative analyzes use of more water-efficient technologies in the depth required by 40 CFR 1502.14.

Furthermore, Lincoln County, Vidler Water Company, Inc. and Cogentrix Energy, Inc. have acknowledged that wet-, air-, and hybrid-cooling options are all possible for this project. A February 26, 2001 letter from Vidler Water Company to the Nevada State Engineer (attached) contained the following statement:

> "In mid 2000, Cogentrix Energy, Inc. approached Vidler and Lincoln about siting a power plant in [Lincoln County]. Cogentrix presented its plans to build a 1000 megawatt combined cycle gas fired plant. *Various plant operation scenarios for cooling purposes, and therefore water demands, are possible*. The first option is a "wet" plant that would require approximately 6700 acre-feet of water annually. The second option is a "dry" plant that uses approximately 1000 acre-feet. The third option, *being seriously considered*, is a hybrid of the dry and wet plant that will use approximately 4000 acre-feet." (emphasis added).

Cogentrix Energy itself considers air cooling generally and hybrid cooling in particular to be viable alternatives to a wet-cooled power plant. These should have been analyzed as alternatives in the DEIS.

Decision Made Before Completing NEPA

On page 2-41, section 2.6.4.3.3, the DEIS states "Toquop Energy has selected a water-cooled mechanical-draft cooling tower as the best available alternative for the project..." (emphasis added). This is contrary to NEPA and the CEQ Guidance, which state "NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made..." (emphasis added) (40 CFR 1500.1).

While an air-cooled plant might not maximize the economic benefits to Toquop Energy, maximizing economic benefits to a private corporation is not identified as part of the purpose and need for the project. Air-cooled power plants are clearly economically competitive, given that other air-cooled plants are being constructed in the area.

Regardless of any pre-NEPA decision made by Toquop Energy, BLM is required to include in an EIS "reasonable alternatives not within the jurisdiction of the lead agency" (40 CFR 1502.14). Given the scarcity of water resources in this area, the other development projects in the area which will require water resources (Lincoln County Land Act and Mesquite Land Act), and that there are

L1-1

other air-cooled power plants in the region, an air-cooled power plant and hybrid cooling should have been analyzed as full alternatives for the project. This would have clearly identified both the positive and negative impacts for the different plant types, and provided a more reasonable range of alternatives for consideration by public officials and citizens.

Failure to Adequately Address Groundwater Resources Impacts

The groundwater resources impact analysis in the DEIS is based solely upon a CH2M HILL 2002 report. The Virgin Valley Water District (VVWD) also prepared a report on the impacts of water resource development in the Tule Desert basin (Katzer et al., 2002). This report was provided to the Nevada State Engineer, Lincoln County and Vidler Water Company in early April 2002, prior to the State Engineer's hearings on their Tule Desert basin groundwater applications, and prior to the release of the DEIS. The analysis in this report contradicts the CH2M HILL report, and shows that groundwater withdrawals of 7,000 – 14,000 acre-feet per year (afy) in the Tule Desert basin will have an adverse impact on the lower Virgin River Valley. In order to have the "best available representation of current and predicted conditions" as claimed in the DEIS, the information from the VVWD report should have been included.

L1-2

The DEIS needs to disclose that there is scientific disagreement regarding the range of possible impacts that could occur from the proposed groundwater withdrawals. These impact evaluations have been completed by recognized scientific experts in this region and field, and the DEIS cannot ignore evaluations which do not fit with the preferred conclusion of no significant impacts.

The DEIS also implies that a single monitoring well would be adequate to determine if there is any significant decline in groundwater levels. Given the acknowledged complexity of the groundwater systems in this area, as described in the DEIS, it is unreasonable to assume that a single monitoring well would be adequate to determine effects from pumping. To date, only minor volumes of water have been pumped from a stock watering well and an exploratory production well in the Tule Desert basin, less than 10 afy and 45 afy, respectively. Water level changes induced by the proposed project, which would withdraw greater than 7,000 afy are unknown. A more complete monitoring program needs to be developed to identify short-term and long-term water level and water quality effects.

L1-3

Failure to Address Water Supply Issues

The project includes the assumption that the Nevada State Engineer will grant to Lincoln County and Vidler Water Company the entire requested amount for this development, and will allow the water to be exported for use at the Toquop parcel. The State Engineer has not yet issued a decision regarding these water right applications. In other recent water rights decisions in the nearby Coyote Springs, California Wash, Garnet Valley and Hidden Valley hydrologic basins, the State Engineer has deferred his decision or granted only a portion of the requested rights because of a lack of scientific information and to avoid adverse impacts.

L1-4

The DEIS does not describe an alternative source of supply for the project, should the groundwater rights not be granted or should the State Engineer require a reduction in groundwater pumping due to impacts to senior water rights holders or the environment. Since this could impact the power plant's

Response to Comment L1-2

The report has been reviewed and considered, and the BLM acknowledges disagreement with the conclusions. The reasons for the disagreement are described in *Section 4.4.1, Ground Water Resources— Incomplete and/or Unavailable Information.*

Response to Comment L1-3

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* clarifies the description of the monitoring program (see *Sections 2.2.3.4 and 4.23, Monitoring*).

Response to Comment L1-4

The FEIS analyzes impacts of a natural gas-fired power plant of up to 1,100 mw utilizing up to 7,000 afy of groundwater from the Tule Basin. The analysis bounds the effects of a smaller plant capacity utilizing less than 7,000 afy of groundwater.

Lincoln County (co-proponent) and Vidler Water Company are the senior permit holders in

the Tule Basin. Considering existing water rights and pending senior applications, there is no unappropriated surface water in the Virgin River. Conveyance of existing permitted surface water from the Virgin River would require new ROWs through ACEC and critical habitat, both inconsistent with the Las Vegas RMP.

The proponents do not have senior groundwater permits in the Virgin Valley Basin or basins with similar proximity to the project site to the east, south, and west. Conveyance of existing permitted groundwater from these basins would require new ROWs through ACEC and critical habitat, both inconsistent with the Las Vegas RMP.

New or existing sources of water other than ROW co-proponents Lincoln County and Vidler Water Company would not fulfill the water-related economic/critical benefits component to the purpose and need.

L1-4

capability to operate, thereby affecting the feasibility of the entire project, it should have been addressed in the DEIS.

Deficient Cumulative Impacts Analysis

The DEIS fails to provide an analysis of cumulative impacts on groundwater resources. In Section 4.4.1.1.3 of the DEIS, it states that full implementation of the Lincoln County Land Act and the Mesquite Land Act will likely have a considerable associated demand, but that sufficient information about the specific demands and potential sources is unavailable. However, the NEPA compliance documents for these actions estimated water use and potential sources. This information should have been included in the DEIS.

L1-5

The groundwater applications filed jointly by Lincoln County and Vidler Water Company in the Tule Desert basin are in the amount of 14,000 afy, which is not clearly identified in the DEIS. The DEIS implies that only 7,000 afy would be removed from this basin, and under the cumulative impacts states "no other reasonably foreseeable action are known to be planned in the region that would utilize the ground water resources from the Tule Desert." Either the cumulative analysis needs to address the entire application amount, or the document should make clear that the groundwater right application is being revised to request only 7,000 afy.

In conclusion, the Authority believes that this DEIS is inadequate in several key areas, including lack of evaluation of reasonable alternatives for the project, lack of complete information on groundwater resources impacts, failure to address water supply issues, and deficient cumulative impacts analysis. A supplemental DEIS that provides a more thorough and complete analysis should be issued.

The Authority appreciates the opportunity to comment on this DEIS. If you have any questions about these comments, please contact me at (702) 258-3108, or Lisa Luptowitz at (702) 862-3789.

Sincerely,

Kay Brothers

Kay Brothers
Deputy General Manager,
Engineering/Operations

KB:LL:sh

c Michael Johnson, Virgin Valley Water District

Attachment: *Files of the Nevada State Engineer; Application #66932.*

Reference cited:

Katzer, Terry, Gary L. Dixon, and Michael Johnson. 2002. *Impact Analysis of Water-Resource Development in Tule Desert, Lincoln County, Nevada on the Water Resources of the Lower Virgin River Valley, Clark County, Nevada.* Prepared for the Virgin Valley Water District. Report VVWD-02.

Response to Comment L1-5

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* includes a separate *Cumulative Impacts* section, Section 4.18, which contains a discussion of cumulative impacts related to this comment.

VIDLER WATER COMPANY, INC.

www.vidlerwater.com

February 26, 2001

Mr. Hugh Ricci, State Engineer
NV Division of Water Resources
123 W. Nye Ln
Carson City, NV 89706-0810

Re: Toquop Energy Project – Application # 66932

Dear Mr. Ricci

This letter is intended to provide information regarding a proposed power plant called the Toquop Energy Project in Lincoln County.

Lincoln County and Vidler Water Company formed a partnership in early 1999 to utilize the counties' water resources. The goal is to bring the county much needed economic development. In mid 1999, water right applications were filed in several basins throughout Lincoln County. The co-applicants are Lincoln County and Vidler Water Company.

In mid 2000, Cogentrix Energy, Inc. approached Vidler and Lincoln about siting a power plant in the County. Cogentrix presented its plan to build a 1000 megawatt combined cycle gas fired plant. Various plant operation scenarios for cooling purposes, and therefore water demand, are possible. The first option is a "wet" plant that would require approximately 6700 Acre-feet of water annually. The second option is a "dry" plant that uses approximately 1000 acre-feet. The third option, being seriously considered, is a hybrid of the dry and wet plant that will use approximately 4000 acre-feet. Cogentrix is currently second in line on the Navajo Transmission Line que and has expended approximately one million dollars on the project to date. Cogentrix is in the preliminary stages of obtaining approval for its environmental permits.

Vidler, through its sister company, Nevada Land and Resource Co., LLC, agreed to acquire the land from the current owner, the Bureau of Land Management. Dorothy A. Timian-Palmer, is the Chief Operating Officer for both Vidler and NLRC. NLRC owns approximately 1.2 million acres of land generally located along the Interstate 80 corridor between Reno and Wendover. The BLM is interested in NLRC land located in the Pah Rah Mountain Range east of Reno. In turn, NLRC identified the Toquop Project land in Lincoln. The location is key since both electric and natural gas transmission lines cross the site (see figure 1).

3364 Goni Road, Suite 111 • Carson City, NV 89701 • Tel 775.885.1818 • Fax 775.885.1811

The County and Vidler agreed to work with Cogentrix to locate and permit the water. The water is to be piped from the Tule Desert groundwater basin to the project, a distance of about 14 miles. Tule was chosen based on its proximity to the site, its "open" status, its relative lack of pumping and its carbonate aquifer tapping potential. Vidler has completed two 2000 foot monitoring wells in Tule Desert. Our hydrogeologist, Gary Small of Hydrosystems, Inc., is currently preparing the final report on the monitor well drilling program. We will file this report with your office after completion. We anticipate drilling one additional monitoring well before deciding where and what size the test/production well should be. Following permit issuance, and depending on the demand, additional production wells will be drilled. Vidler is very committed to this project having expended approximately one million dollars to date.

Lincoln/Vidler have two water right applications in the Tule basin. The Applications are numbered 64692 and 64693 (figure 2). The National Park Service and the Virgin Valley Water District protested the applications. Application number 64693 was recently changed to 66932 to modify the point of diversion to match the monitor well site and to include the project in the place of use. Steve Walker, Walker and Associates, is currently analyzing the National Park Service protest and Dorothy is working with the Virgin Valley Water District concerning their issues. Hopefully, we will have these protests resolved within the next 90 days.

Please call if you have any questions at 775-885-5000 extension 102

Sincerely,

David A. Merrill, P.E.
Project Engineer

C: Christine Thiel, P.E., Deputy State Engineer, NV Division of Water Resources
Lincoln County Commissioners, c/o Corrine Hogan, County Clerk w/o Attachments
Pat King, Vice President, Cogentrix Energy, Inc. w/o Attachments

VIRGIN VALLEY WATER DISTRICT
500 Riverside Road
Mesquite, Nevada 89027
(702) 346-5731
Fax (702) 346-2596

August 29, 2002

Gene A. Kolkman, Field Manager
Bureau of Land Management
Ely Field Office
HC 33 Box 33500
Ely, NV 89301-9408

Mr. Kolkman.

Subject: COMMENTS TO DRAFT TOQUOP LAND DISPOSAL AMENDMENT TO THE CALIENTE MANAGEMENT FRAMEWORK PLAN AND DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE TOQUOP ENERGY PROJECT: DES 01-17

Enclosed are the comments by the Virgin Valley Water District (VVWD) for the above referenced draft environmental impact statement. Upon review of the technical documents supporting the hydrogeology for the proposed project, several scientific discrepancies are observed.

VVWD submits the following document, which more completely addresses the hydrogeology of the Lower Virgin River Valley and impacts associated with pumping over 7,000 acre-feet of ground water from Tule Desert.

Geology and hydrology of the lower Virgin River Valley in Nevada, Arizona and Utah: Virgin Valley Water District, Mesquite, Nevada, Report No. VVWD-01, 126 p. Dixon, G. L., and Katzer, T., 2002.

While this report was referenced in the DEIS, clearly the authors did not understand the hydrology as presented in the report and have not reviewed specific sections. The following reports were released by Virgin Valley Water District in April 2002 and more

Letter - L2. Signatory - Michael Winters. (Virgin Valley Water District)

VIRGIN VALLEY WATER DISTRICT

appropriately, address the water resources of the lower Virgin River Valley ground-water flow system:

Impact Analysis of Water Resource Development in Tule Desert, Lincoln County, Nevada on the Water Resources of the Lower Virgin River Valley Clark County, Nevada. Virgin Valley Water District, Mesquite, Nevada, Report No. VVWD-02, 51 p., Katzer, T., Dixon, G. L., and Johnson, M., 2002.

An Isotopic and Geochemical Evaluation of Groundwater in the Tule Desert Area of Southeastern Nevada. Consultant Report for Virgin Valley Water District, Mesquite, Nevada, Report No. VVWD-03, 22 p., Thomas, J.M., 2002

The following documents are additional information

Transcript of Proceedings Volume I through III; In the matter of Applications Nos. 64692, 64693 and 66932 filed by Lincoln County and Vidler Water Company, Inc. To appropriate public waters of an underground source within the Tule Desert Hydrographic Basin (#221) and to change the point of diversion and place of use of Application 64693.

Nevada State Attorney General opinion 2002-15, issued March 21, 2002 addresses legality of agreements between Lincoln County and Vidler Water Company, Inc.

Please enter these documents along with the specified comments from the VVWD. The VVWD is not opposed to a power plant, however VVWD opposes the wasteful use of water resources associated with a water-cooled power plant within the most arid region in the country in proximity to one of the fastest growing communities in the nation.

VVWD would fully support an air-cooled power plant designed with the best available technology that provides benefit to the community. Should you have any questions or require additional information please contact me at 702-346-5731.

Sincerely,

Michael Winters
General Manager, Virgin Valley Water District

C: George Benesch, General Council, Virgin Valley Water District

Toquop Electric Generation Project
Draft Environmental Impact Statement Comments
Virgin Valley Water District

Purpose:

The purpose of this document is to provide technical comments regarding the Draft EIS for the Toquop Energy Project.

Summary:

Virgin Valley Water District serves approximately 16,000 residents with 4,320 connections in southeastern Nevada. VVWD has approximately 12,000 acre-feet per year of ground water and 2,500 acre feet per year of surface water to supply the total required water resources. The City of Mesquite, located in Clark County, Nevada, is the fastest growing city in the United States with a population less than 50,000. The proposed Toquop Generation plant requires a ground water resource in excess of 7000 acre feet per year. VVWD's interest is in assuring continued reliable water operations and it is critical that state water resources be appropriately allocated. VVWD recognizes and supports increasing electric supply in the state and supports the economic benefits that can accrue to Lincoln County and the state of Nevada from the construction and operation of the proposed generation facility. However, it is critical that the design of the generator includes cooling technology that minimizes water demand and that the generation plant is connected to the electric grid in a manner that benefits the local electric utilities. Federal and state agencies should remain diligent in avoiding speculative exploitation of water resources for power generation or any other purpose.

Comments:

L2-1

1. Toquop Energy currently has no permit to appropriate public waters of the State of Nevada. The existing perennial yield as established in State of Nevada Department of Conservation and Natural Resources, Division of Water Resources Water Resource Reconnaissance Series Report 51, table 16 states the perennial yield is 1,000 acre-feet. If the identified perennial yield is 1,000 acre-feet per year, how can BLM not recognize the limited water resource availability in the region and sanction the use of 7 times the established perennial yield and allow Toquop Energy pre-select a wet-cooled power plant as the best available alternative.

2. Applications Nos. 64692, 64693 and 66932, filed by Lincoln County and Vidler Water Company, Inc. to appropriate public waters of an underground source within the Tule Desert Hydrographic Basin (#221) and to change the point of

Response to Comment L2-1

With respect to the perennial yield being 1,000 acre-feet per year (afy), page 64 of the State of Nevada, Department of Conservation and Natural Resources, Division of Water Resources, Water Resources Reconnaissance Series Report 51(Glancy and Van Denburgh, 1969), states that, "the preliminary estimate of water that could be salvaged within the Tule Desert is assumed for reconnaissance purposes to be about one-half the estimated annual recharge or about 1,000 acre-feet." Table 18 (page 63) of the same report (Report No. 51) lists the "estimated perennial yield" at 1,000 acre-feet.

Specifically, the estimated value of 1,000 afy is based on a method (Eakin et al., 1951) that correlates altitude with precipitation to estimate the amount of recharge. No attempt was made in Report No. 51 to verify through field studies (e.g., local vegetative analyses) that the assumed precipitation values were appropriate. Subsequent reports by consultants to Virgin Valley Water District (Dixon and Katzer, 2002, referenced in the DEIS), present a method that improves the accuracy of the recharge estimates. Walker and Associates (2002) use a similar approach as reported in Dixon and Katzer 2002 and conclude that, "considerably more recharge occurred [in the Tule Desert] than originally estimated by [Report No. 51]."

Additionally, in a recent report prepared by consultants to Virgin Valley Water District (Katzer et al., 2002, Table 3), the annual ground-water recharge for the Tule Desert is estimated to be 8,968 afy. Katzer a et al. (2002) further state (page 31) that, "the original study [in Report No. 51] is outdated…[The Report No. 51] estimate of perennial yield was no more than a reconnaissance estimate and cannot be supported with today's data base and new techniques." Lastly, page 32 of Katzer et al. (2002) states, "the perennial yield or groundwater recharge [is] 9,000 afy for the Tule Desert."

diversion and place of use of Application 64693, identify the place of use as the Lincoln County Land Act and the Toquop Energy project parcel. BLM has not included in the draft EIS the cumulative impacts to the lower Virgin River Basin and existing senior water right permit holders for both of the proposed actions.

L2-2

3. The place of use for Applications Nos. 64692, 64693 and 66932 filed by Lincoln County and Vidler Water Company, Inc. to appropriate public waters of an underground source within the Tule Desert Hydrographic Basin (#221) and to change the point of diversion and place of use of Application 64693 does not include the alternative 2 location for the Toquop Energy's facility specified in the subject DEIS. How can BLM include an alternative when there is not an identified water supply for the project?

L2-3

4. Under the opinion of the Nevada Attorney General's Office, the agreement between Lincoln County and Vidler Water Company is not legal. How can Vidler Water Company enter into an agreement with Toquop Energy committing water resources to the project when the agreement involves a political subdivision of the State and is not recognized as legal under the laws of the State of Nevada?

5 The proposed generation plant as characterized in the Executive Summary (ES-1, Purpose and Need) could contribute to meeting capacity and annual energy requirements regionally. Since no electrical transmission interconnection is contemplated to the Power District serving the city of Mesquite, Nevada and local customers, there is no improvement in local electric service or reliability. The Toquop Generation plant intends to electrically interconnect to the existing Navajo 500kV AC transmission line subject to study and approval of the transmission operator, Nevada Power Company. This will not enhance the lower voltage transmission system serving the City of Mesquite, Lincoln County Land Act and other local electric customers.

L2-4

6. No source of electrical power for the proposed production wells in Tule Desert is identified. The 15 production wells will place a substantial increased load on the already weak existing 138 kva radial electrical grid serving the Mesquite, Nevada area. The increased demand will reduce the system reliability and is not in the best interest of the community.

L2-5

L2-6

7 The Proposed Toquop Generation Plant is proposed as a wet cooled plant as stated in Chapter 2, Sections 2.2.3.4 and will require up to 7,000 acre feet of water per year. The use of this amount of water for cooling purposes could be obviated by using dry cooled technology either in total or in combination with wet cooling. This would substantially reduce the annual water demand but was not considered for the reasons described in Section 2.6.4. The arguments used in Section 2.6.4 do not accurately reflect the considerations and economics of other proposed projects in southern Nevada (See tables below).

Response to Comment L2-2

Section 4.4.2.1.1 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* demonstrates that there will be no substantial decline in ground water levels or a substantial depletion of ground water resources in the Virgin River Valley.

Response to Comment L2-3

The source of water for Alternative 2 is stated in the DEIS to be the same as for the Proposed Action (See Section 2.4.3, page 2-31).

Response to Comment L2-4

As stated in the Sections 1.2 and 1.3 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project*, the Toquop power project would contribute to meeting the demand for power in the Las Vegas area and would also contribute to meeting the capacity and annual energy requirements for the southern Nevada power area. Although the City of Mesquite and adjacent areas are not served from a direct connection to the Navajo Transmission Line or

the Red Butte-Harry Allen Electric Transmission Line, the overall strengthening of the power grid in the southern Nevada area will have a positive benefit to the reliability and electrical service to the region, including the City of Mesquite and adjacent areas, including the Overton Power District.

Response to Comment L2-5

As stated in *Section 4.3.1.1.1*, of the DEIS, the source of power for the wellfield will be electricity generated at the power plant and conveyed to the wellfield along the utility corridor. Chapter 2 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* contains a similar statement in the description of the Proposed Action and alternatives.

Response to Comment L2-6

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

The following tables reflect projected annual water use for proposed generation projects in southern Nevada and it is apparent that other projects are using dry cooled technologies for cooling:

Table - 1. - Air-cooled power plants located in southern Nevada (data source Clark County Department of Air Quality Management):

Operator	Plant Designation	Plant Output (megawatts)	Water Usage (acre-feet)
Duke	Moapa	1170	700
Mirant	Apex	1100	700
GenWest	Silverhawk	600	350
Reliant	Arrow Canyon	500	300
Reliant	Bighorn	900	220
Nevada Power	Harry Allen [1]	960	450
Diamond Generating	Ivanpah	500	55

[1] Expansion of existing facility

Table – 2. – Proposed water-cooled power plants in southern Nevada

Operator	Plant Designation	Plant Output (megawatts)	Water Usage (acre-feet)
PG&E	Meadow Valley Generating Center	1196	6615 [A]
Calpine	Moapa Paiute Energy Center	1120	7000
Cogentrix	Toquop Energy	1100	9000 [B]

[A] Utilizes existing permitted water rights

[B] Volume identified as maximum under agreement with LC/VWCI, actual volume obtained from picoholdings.com web site.

The State Engineer of Nevada has previously issued water permits sufficient for the use of dry cooled technology in cases where applicants were requesting water permits for electric generation uses. VVWD has serious concerns that the impact of ground-water extraction from the basin will impact the existing ground water and the surface water yields and believes this is not in the public interest of the residents of Nevada.

L2-6

Recommendations:

L2-7 1. The BLM should require evaluation of a 120 kV transmission interconnect to the Overton Power District to improve transmission reliability to the local electrical grid.

L2-8 2. The BLM should require full environmental and economic analysis of dry cooled alternatives for the Toquop Energy Project as opposed to the token effort set forth in current DEIS.

Comments to specific Sections are as follows:

L2-9 Section 2.2.3.2, p. 2-21, Equalization and evaporation ponds should have a series of monitor wells surrounding them to determine if they are leaking. No mention is made of the tons of total dissolved solids that will be produced and hauled to an off-site disposal area, which is not identified. The closest is the Mesquite Landfill, which is up gradient from the Virgin River so there is the potential for flood flows to mobilize the "dry wastes" and deposit them in the Virgin River. Additionally the direction of flow of the ground water underlying the landfill is toward several public supply wells. Thus there is a potential for contamination if the 'dry wastes' are mobilized by precipitation and infiltrate through the overlying sediments and reach the water table. There is no evaluation of this process in the DEIS.

L2-10

L2-11 Section 3.2.2.1.1, p: 3-3, Authors go into exhaustive dissertation on the regional geologic history and setting without any references. Apparently authors have done a lifetime of work in the Lower Virgin River Valley and Tule Desert, but have not published a single technical paper on the subject since the plethora of scientific information is not referenced. No reference is made to mapping by Tschanz and Pampeyan (1970) or the numerous publications on the structural and tectonic relationship in the area by Axen (1990) and numerous documents by Andersen (Anderson and Barnhard, 1993a; Anderson and Barnhard 1993b, Anderson and Hintze 1993). Carpenter (1989, 1994) has several publication and extensive mapping in the Tule Desert area and has not been referenced by the DEIS authors

L2-12 Map 3-2 is from Stewart (1980) however no reference is made to the publication. DEIS author have renamed mapped faults by Tschanz (1970), Carpenter (1994), Dixon and Katzer (2002). Only two faults have been properly named and identified which are the Gourd Spring and East Mormon faults. DEIS authors illustrate a small portion of the structures in the area and did not reference the major faults which are the East Tule Desert and West Tule Desert faults as defined and mapped by Carpenter (1994). The fault zones link subsurface flow from Tule Desert into the lower Virgin River Valley. The Piedmont fault as depicted on Map 3-2 is totally incorrect. The Piedmont fault as mapped by Moore (1972) is one of the major basin-forming faults in the lower Virgin

Response to Comment L2-7

Comment noted.

Response to Comment L2-8

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

Response to Comment L2-9

As stated on page 2-18 (*Section 2.2.3.2*) of the DEIS, the evaporation and equalization ponds will be double-lined to reduce the potential for leakage. All relevant permits to operate these ponds will be sought from the appropriate state and local regulatory authorities. The operation and monitoring of these ponds will be in compliance with all applicable and relevant state and local laws and requirements. The ponds will include a leak detection system.

Response to Comment L2-10

As stated on page 2-18 (Section 2.2.3.2) of the DEIS, the solids that settle out from the discharge into the evaporation ponds will be removed from the site and disposed of at an approved offsite disposal facility. The disposal process will be conducted in a manner that is in accordance with all applicable and relevant laws and regulations governing the disposal of such material. The Mesquite landfill could receive the pond solids if the material is assessed to be compatible with the type of waste that is acceptable for disposal at that landfill.

Response to Comment L2-11

All of the listed documents were reviewed in the preparation of the DEIS. Most of the documents have been specifically cited in the *Ground Water Technical Resources Report* by CH2M HILL (2002b) which served as the basis for the DEIS work.

Response to Comment L2-12

Map 3-2 has been revised. See response to Comment L2-11.

L2-12 River valley and continues a southwest trend into Nevada towards Lake Mead at the base of the Virgin Mountains.

L2-13 Bohannon and others defined the Virgin River Depression in 1993 based on interpretations from gravity and seismic data. Nowhere has this been defined by the line depicted on Map3-2. Bohannon (1993) did not constrain the tectonically derived basin to certain parts of the valley fill, but included the entire basin. The magenta colored line depicted on Map 3-2 is merely a figment of the DEIS authors and not referenced in the literature.

L2-14 Section3.2.2.1.2, p. 3-9, Substrate at the plant site consists of Muddy Creek, Bohannon, (1984) does not describe any cemented conglomerate in the upper portion of the Muddy Creek. Dixon and Katzer, 2002 identified Quaternary sediments related to ground water discharge approximately 1 mile north of the plant site, no indication that at the surface Tertiary Muddy Creek is exposed at the plant site.

L2-15 Section 3.2.2.1.3, p. 3-9, DEIS Authors identify the most significant active fault as the Piedmont fault. They have failed to identify the most significant faults in Tule Desert, which are the East Tule Desert and West Tule Desert faults (Carpenter, 1994) The authors have not identified the quaternary faults scarp in the alluvium associated with the East Tule Desert fault in the vicinity of MW#2 (Carpenter, 1994).

L2-16 Section 3.3.1.3 1, p. 3-15, Text describes the principal components to the flow of the Virgin River in the vicinity of the project area, but ignores the contribution from ground water. Dixon and Katzer (2002, plate 3) clearly show the direction of ground water is to the Virgin River throughout the lower Virgin River Valley. This in-flow to the river has been documented by Glancy and Van Denburgh (1969, p. 36) **This omission reflects an obvious bias by the authors of the EIS to show the ground water in the Toquop Wash area does not reach the river.** The misstatement concerning lack of ground-water inflow to the river appears in many places in the DEIS.

L2-17 Text states little or no flow actually occurs at the confluence of Beaver Dam Wash and the Virgin River. Beaver Dam Wash is perennial in the reach immediately upstream from the confluence with the Virgin River. **This error has no impact on the Project area, but does reflect a lack of attention to hydrology by the authors of the EIS.**

L2-18 Section 3.3.1.3.1, p. 3-16, Another example of either a misunderstanding of hydrology or lack of attention to the literature is the reference to a single measurement of flow of the Virgin River upstream from Lake Mead by Metcalf (1995) of "17,400 acre-feet per year." To make a miscellaneous measurement of 17,400 acre-feet would require measuring nearly 9,000 cubic-feet/second. And it is inappropriate to consider that as

Response to Comment L2-13

Map 3-2 in the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* includes the notation "The line depicted on the map is intended to approximate the boundary of the Virgin Valley Depression for illustrative purposes and is not intended to be an exact demarcation."

Response to Comment L2-14

Section 3.2.2.1.2 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* contains text in response to this comment.

Response to Comment L2-15

Comment noted.

Response to Comment L2-16

Dixon and Katzer (2002) was reviewed during preparation of the DEIS and the BLM disagrees with the conclusions of that report with respect to ground water inflow to the Virgin River. The

DEIS concludes that there is no significant ground water inflow to the Virgin River, and the rationale for this conclusion is presented in CH2M HILL (2002b) which is cited in the FEIS. The contours of groundwater elevation depicted on Plate 3 of Dixon and Katzer (2002) are unfounded in many locations.

Page 36 of Glancy and Van Denburgh (1969) describes the possibility of ground-water discharge to the Virgin River as follows: "ground-water flow from recharge areas northwest and southeast of the river probably enters the river system along the channel between the Littlefield gage and Lake Mead. However, the magnitude of flow and areas where it enters the Virgin River are unknown." The report does not present any direct evidence to support this hypothesis. The report does, however, present indirect evidence consisting of unsupported comments by local residents who, "report that springs were occasionally observed along the channel near Mesquite, Bunkerville, and Riverside." In addition, based on a single measurement on July 17, 1968, the flow 8 miles downstream of the Littlefield gage was found to be 10 percent greater that at the gage itself. The report implies that the cause of the increase in flow was uncertain but, "may have been the result of return flow from the Littlefield and Petrified Springs canals, additional ground-water discharge to the stream channel, or a combination of both." The possibility that groundwater flow could discharge into the Virgin River, however, is not documented in Glancy and Van Denburgh (1969) as stated in the comment.

Response to Comment L2-17

Little or no flow from Beaver Dam Wash into the Virgin River is cited as a common occurrence in Holmes et al. (1997).

Response to Comment L2-18

The text of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* puts the value reported by Mecalf (1995) in proper context. The conclusions of the DEIS are not affected by this revision.

L2-18 yearly flow. What Metcalf did (1995, Table 7., p. 62, Appendix C, p. 163) was make a miscellaneous measurement of 24 cubic-feet/second. The authors wrongly expanded that number to an annual volume, thus showing they have little understanding of Virgin River hydrology.

L2-19 Section 3.4.3.1.1, p. 3-27 and 3-29, Text states low chloride values typify ground water in the carbonate aquifer, however this is contrary to the work of Thomas (2002). DEIS authors continually ignore data that doesn't fit their model.

L2-20 Section 3.4.3.1.1, p. 3-30. Text states the source of ground water in the carbonate aquifer can only be from the north in the Panaca area and they infer the carbonate water is in addition to the water recharged in Tule Desert. DEIS authors ignore carbonate inflow from the northeast and east because that water is clearly from the lower Virgin River Valley drainage area, is part of the total basin water budget, and is already applied for by ground-water applications.

L2-21 Section 3.4.2.1.3, p. 3-34/35, Text states the source of Littlefield Springs is mainly from the Virgin River that infiltrates into sinkholes upstream in Utah and emerges downstream at the Littlefield Springs, EIS Authors cite Trudeau et al., (1983) as their source. However there is no mention of the sink holes in the reference. Cole and Katzer (2000) were the first to identify the sinkholes and further indicated that the flow of the Littlefield Springs was about half ground-water discharge. Once again DEIS authors paid scant attention to the literature.

L2-22 Section 3.4.2.2.3, p. 3-36, Text states that Dixon and Katzer (2002) estimate the perennial yield of the basin-fill aquifer system in the Virgin River Valley is approximately 40,000 afy, after estimates of current pumping are taken into account. This is wrong. The estimate of 40,000 afy of perennial yield includes the current pumping (Dixon and Katzer, 2002, p. 82 & 96). Yet another example of lack of attention to detail by the DEIS authors.

L2-23 Section 3.4.2.3, p. 3-37, Text states CH2M HILL (2002) presents the evidence that there is no ground-water discharge to the Virgin River. This is incorrect and is the result of bias by the DEIS authors who do not want to admit that ground water in the lower Virgin River Valley, including Tule Desert does discharge to the Virgin River. As stated previously in this review this in-flow to the river has been documented by Glancy and Van Denburgh (1969, p. 36). Metcalf (1995, p. 150) indicated her data were inconclusive regarding ground-water discharge to the river. Woessner et al., (1981, p. 45) indicates ground water does discharge to the river. Brothers et al., (1993) and Dixon and Katzer (2002) all present data that shows there is not enough water in the river to satisfy the ET demand without a ground-water component. DEIS author's credibility is seriously degraded by their unwillingness to confront this issue.

L2-24 Section 4.4.1.1.1 p. 4-7, CH2M HILL (2002) state that that Tule Desert is essentially a hydrologic sub-unit of the Virgin River Valley, by extracting water from

Response to Comment L2-19

Thomas (2002), does not directly discuss chloride as an indicator of groundwater in the carbonate aquifer, but where Thomas (2002) does discuss chloride the statements are consistent with the EIS. Specifically, on page 1 of Thomas (2002), it is stated, "groundwater from the deep production well [in the Tule Desert] has the lowest chloride and some of the highest sulfate and sodium of any of the Tule Desert area groundwater. The low chloride concentration may indicate that this groundwater has flowed into the [Tule Desert] basin from a deep regional water source and has not interacted with the local rocks and sediments as extensively as the other groundwater in the basin." Because the "deep regional water source" is the carbonate aquifer in the vicinity of the Tule Desert, the implication of these quotes from Thomas (2002) is that chloride concentration in the deep production well in the Tule Desert could be indicative of water from the regional carbonate aquifer system. This is consistent with the conclusions presented in the DEIS.

Response to Comment L2-20

All available chemical data on groundwater to the northeast and east of the Tule Desert (reported in CH2M HILL, 2002a) suggests that

groundwater from these areas does not flow into the Tule Desert. Specifically, deuterium data from North Tunnel Spring, Upper Lime Mountain Well and Lower Lime Mountain Well (-94, -87 and -86 permil, respectively) suggest that there is no correlation between groundwater from these locations (which are northeast and east of the Tule Desert, respectively), and the deep production well in the Tule Desert.

Response to Comment L2-21

Section 3.4.2.1.3, Springs, better describes the potential sources of water to Littlefield Springs discussed in Trudeau et al. (1983)and Cole and Katzer (2002).

Response to Comment L2-22

Section 3.4.2.2.3, Aquifer Characteristics, replaces the phrase, "taken into account" with the word "include." The conclusions of the DEIS are not affected by this revision.

Response to Comment L2-23

BLM acknowledges disagreement on this issue. *Section 3.4.2.2.4, Virgin River/Ground Water Interaction*, of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* characterizes the nature of the disagreement. Section 4.1.2 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* addresses incomplete and/or unavailable information.

Response to Comment L2-24

As stated in Section 4.4.1.1.1 (page 4-7) of the DEIS, "Outside the Tule Desert, specifically, in the Virgin River Valley hydrographic area, groundwater levels, as well as the availability of the groundwater resources, would remain unchanged as a result of pumping in the Tule Desert." Section 4.4.1.1.1 (pages 4-9 and 4-10) of the DEIS presents the results of six separate analyses to support the conclusion that project pumping would not result in either substantial groundwater level declines or a substantial depletion of the groundwater resource within the Virgin River Valley.

L2-24

Tule Desert ground water is no longer able to directly recharge the confined aquifer system associated with the lower Virgin River Valley (Katzer, 2002). This impacts the senior water right permit holders and applicants reducing the volume .The two basins are connected through the surface drainage of Toquop Wash and sub-surface flow. (Katzer, 2002, Dixon 2002)

L2-25

Section 4.4.1.1.1, p. 4-7, Text discusses ground-water level declines in Tule Desert and in adjacent lower Virgin River Valley resulting from pumping 7,000 afy from Tule Desert. The conclusions are that ground-water level declines will be insignificant and the removal of 7,000 afy for 42 years will not create adverse impacts, either in Tule Desert or the lower Virgin River Valley. The only aquifer test in the valley produced a pumping drawdown of several hundred feet. This single test is insufficient to accurately calculate the drawdowns from full production. It is doubtful pumping will be restricted to the underlying bedrock since any reduction in pressure at the bedrock-alluvial contact will induce ground water from the alluvial aquifer. The EIS authors indicate the bedrock is the target production zone, but at the same time they indicate the bedrock has poor ability to transmit ground water. The further indicate the low transmissivity will restrict the spread of the water-level decline. This is incorrect hydrologically and easily proved by solving the Theis non-equilibrium equation drawdown based on the Cooper-Jacob modification is: $s = 264\ Q/T * \log (0.3\ Tt/r^2 * S)$; Where s = drawdown, in feet at distance r from the pumping well; Q = pumping rate in gpm; T = transmissivity, in gallons per day per foot; t = time in days for the duration of the pumping test and S = a storage coefficient of 0.005. For the example problem assume:

L2-26

$$Q = 2000\ gpm,\ T = 12{,}000\ g/d/ft,\ t = 20\ years,\ r = 1\ mile,\ and\ S = 0.005.$$

Solving the Theis non-equilibrium by substituting the above values equals a drawdown one mile from the pumping well of 100 ft. Increasing the T to 18,000g/d/ft and holding the other values constant equals a drawdown of about 70 ft. So the greater the T the less the drawdown.

L2-27

The text also states most of the water entering the project wells will come from the north because of the steep gradient so there will be little impact on the ground-water system to the south, particularly in the lower Virgin River Valley. This is absolute nonsense. Once pumping begins the gradients surrounding the wells tend to equalize. The ground water pumped will come from transient storage and will no longer be available to the down-gradient part of the flow system. This ground-water flow system will adjust by a decline in water levels. It is incorrect to state pumping will intercept all the natural ground-water discharge and therefore have no impact on the remaining ground water in the basin.

Regardless of the magnitude of the drawdown the simple fact is the water removed from Tule Desert has already been applied for by the senior water-right purveyor in the lower

Response to Comment L2-25

Section 3.4.2.1.2 (page 3-30) cites the Water Resources Technical Report (CH2M HILL, 2002b) as providing the results of the aquifer testing in the Tule Desert. Neither the EIS nor CH2M HILL (2002b) use the aquifer tests directly to calculate the water-level decline at full production. Inasmuch as these aquifer tests provide the only actual hydraulic data on groundwater in the Tule Desert, the EIS appropriately bases its conclusions regarding anticipated water-level declines on these results.

Response to Comment L2-26

Section 4.4.1.1.1 (page 4-8) of the DEIS states, "...low transmissivity acts to limit the lateral extent of water level decline around a pumping well (that is, the lower the transmissivity, the smaller the radius of influence around a well)." This statement is based on the relationship in the Theis non-equilibrium equation, cited in the comment. At issue is the extent of the radius of influence of the well, and not the water level decline (drawdown) at a particular radial distance. Specifically, the comment is correct in stating that with an increase in transmissivity there will be a reduction in drawdown at the same distance from the well, all other parameters (aquifer storativity, and pumping duration and rate) being constant. However, the

reason for the reduced drawdown at a given distance from the well is because the overall radius of influence of the well increases with higher transmissivity (i.e., the water flows to the well from a greater lateral distance the higher the transmissivity) because the volume of aquifer affected is constant (in the case where aquifer storativity, and pumping duration and rate are unchanged).

Response to Comment L2-27

Wells pumped under the influence of a strong uni-directional horizontal component of hydraulic gradient, such as observed in the Tule Desert, will develop an asymmetrical cone of depression in which the water level declines will be less over a similar distance downgradient (i.e., south, in the Tule Desert) of the wells.

As stated in Section 4.4.1.1.1 (page 4-7), "the maximum drawdown would remain above the top of the fractured-rock aquifer and no de-watering of the aquifer would occur." This point, together with the conclusion presented in 3.4.2.1.2 (page 3-31) that, groundwater is confined under pressure within the fractures of the rock" supports the conclusion that water that flows to the production wells in the Tule Desert is derived primarily from the expansion of the water and the compression of the rock, and less from groundwater in storage.

Virgin River Basin, which depends, in part, on the recharge from Tule Desert. DEIS authors have misstated and confused simple hydrologic laws.

L2-28

Ground water model presented by CH2M HILL (2002) does not represent existing conditions, is grossly over simplified and not calibrated. Therefore the simplistic model is of no practical value in assessing potential impacts of pumping in Tule Desert on the lower Virgin River Valley. The ground water model does not include the geophysical data, ground water elevations, borehole lithologies or recharge estimates.. The model area uses constant head boundaries, which correlates to an inexhaustible supply of water entering the model from the north. Based on Darcy's law as presented by CH2M HILL (2002) flow through the model is approximately 43,000 acre-feet per year. This is several orders of magnitude higher than data presented in Glancy and Vandenburg (1969). Width of the flow system is 25 miles, length 45 miles, transmissivity = 14,500 gallons per day / square foot and equivalent to a 2% gradient. From water level data presented (Katzer 2002) the groundwater gradient is 1%. The significance is that the southern constant head boundary as presented (CH2M HILL, 2002) is at or near sea level to achieve the 2% gradient over the 45-mile long model length, which is not possible. This calculates to a 4750-foot head loss through out the model area. The model analysis is based on aquifer tests that pumped under 60 acre-feet of water (page 4-10 CH2M HILL, 2002).

L2-29

Section 4.4.1.1.1, p. 4-9. Text states as one of the reasons the Tule Desert pumping will not impact the water resources in the lower Virgin River Valley is Dixon and Katzer (2002) estimated a perennial yield of 40,000 afy after current pumping of about 12,000 afy is taken into account. This is wrong and as previously stated in this review the total estimate of perennial yield is 40,000 afy. When the existing pumping is subtracted there is 28,000-afy remaining. If 7,000 afy is developed in Tule Desert then that leaves a balance of 21,000 afy of perennial yield.

L2-30

The DEIS implies that the 7,000 acre-feet per year is still under the estimated perennial yield. This does not take into account the 262,000 acre-feet in application to appropriate ground water on file with the Nevada State Engineers office that pre-date the 1999 filings in Tule Desert by Lincoln County and Vidler Water. What number is actual being is actually required; the DEIS has values of 7,000, 7,100 and 7,200 acre-feet per year. The agreement for purchasing water by Toquop Energy states up to 9,000 acre-feet per year DEIS authors continually misrepresent the existing literature.

L2-31

The Muddy Creek Formation is understood only by CH2MHILL (2002) to be unconfined. Dixon and Katzer (2002) indicate ground water in the Muddy Creek is artesian and controlled by the numerous north-south trending faults that riddle the Muddy Creek. Additionally the well drillers report submitted to Division of Water Resources, log number 43686, is a 805-foot well completed in the Muddy Creek associated with permit no. 52296. This well is located southwest of Bunkerville, Nevada, south of the river on the lower terrace of the Virgin River flood plain and is a flowing-artesian well at

Response to Comment L2-28

A simple numerical model is of great practical value in assessing potential impacts in the absence of additional data. The purpose of the model used in CH2M HILL (2002b), the results of which are presented in Section 4.4.1.1.1 (page 4-7) of the DEIS, is to estimate the anticipated water level declines in the presence of a steep hydraulic gradient. The purpose of model was not to simulate ground water flow in the Tule Desert, and therefore the model was not calibrated as it was only important to represent the observed hydraulic gradient and then simulate pumping under those conditions. The boundaries of the model were deliberately placed at some distance from the simulated wells so as not to affect the results of the simulations. The actual values at the boundaries are irrelevant, only the gradient that resulted.

Katzer et al. (2002) has been reviewed and considered, and the BLM acknowledges disagreement with the conclusions. The reasons for the disagreement are described in *Section 4.4.1, Ground Water Resources Incomplete and/or Unavailable Information.*

Response to Comment L2-29

The comment supports the conclusion stated in *Section 4.4.1.1.1* of no significant impact to

ground water resources in the Virgin River Valley by stating that after taking the project pumping into account there would still be 21,000 afy of perennial yield in the Virgin River Valley. Also, as noted in the response to Comment L2-22, text in the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* replaces the phrase "taken into account" with the word "include."

Response to Comment L2-30

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* uses 7,000 acre-feet per year consistently throughout the document. The impact analysis in the DEIS also used 7,000 acre-feet per year.

Response to Comment L2-31

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* states that there is evidence that the ground water in the Muddy Creek Formation within the Virgin River Valley is confined. The conclusions of the DEIS were not changed by this revision.

With respect to the water quality data presented, the results are insufficient to conclude that the ground water from the well in question is similar to the water quality associated with the Tule Desert. Although the values of chloride, arsenic and total dissolved solids are similar to analyses from the Tule Desert, there are no data on deuterium or key cations such as calcium, potassium and sodium that are necessary to draw a definitive conclusion with respect to a comparison of water types.

L2-31

5 gallons per minute. Clearly the ground water in the Muddy Creek is confined. Ground water quality associated with the well indicates the water quality is similar to the water quality associated with Tule Desert. The chloride concentration is 10 milligrams per liter (mg/l), arsenic is 0.0080 mg/l, and total dissolved solids of 410 mg/l Attached is the well log and chemical analysis associated with permit no. 52296.

L2-32

p. 4-9/10 continued. Text indicates the results of the singular aquifer test in Tule Desert proves there will be no adverse impact resulting from ground-water drawdowns on the water resources of the lower Virgin River Valley. DEIS authors ignore the lack of homogeneity and isotropy.

L2-33

Text further cites Las Vegas Valley Water District (1992) as additional evidence that there will be no impact. This is inappropriate because the Tule Desert ground-water system behaves entirely different than the Virgin River floodplain aquifer even though they are connected hydraulically by the Muddy Creek Formation. Text defines ground-water flow directions as conveniently moving south out of Tule Desert, but west of the Toquop Wash so there can be no impact on ground-water levels or resources in the lower Virgin River Valley. In fact Tule Desert is bisected by numerous north trending faults, including the Toquop Wash fault, that are conduits for preferred ground-water flow. DEIS authors either do not understand the hydrogeology or are biased in their interpretations.

L2-34

Section 4.4.1.2.1, p. 4-11, Text states pumping in Tule Desert will have no impact on any springs in the entire basin. As presented previously in this review there is significant evidence to indicate the Virgin River reach between the Littlefield gaging station and the Riverside Bridge, which is downstream from the junction of Toquop Wash and the Virgin River is an area of ground-water discharge. There are reported springs (BioWest, oral commun., 2002) downstream from the Riverside Bridge. Much of the lower river is dry or at very low flow during the summer months, however, the amount of evapotranspiration is significant and indicates that there must be some contribution to the shallow floodplain aquifer by ground water. Some of this ground water originates in Tule Desert. This is a fact the DEIS authors choose to ignore.

L2-35

Section 4.18.3, p. 4-84, Text has one sentence summarizing the unavoidable adverse impacts on ground-water resources. And fortuitously there appear to be none according to DEIS authors. Impacts are minimized or ignored through out the DEIS. In reality, ground-water drawdowns in Tule Desert will be several hundred feet at the well heads and in the range of 100-300 feet several miles downgradient in the lower Virgin River Valley. The amount of ground water consumed from Tule Desert will not be available for use by the single Public Municipal Water Purveyor in the basin. The Toquop Wash area has been identified as a potential ground-water development resource area (Dixon and Katzer, 2002, Figure 17, p. 91) and the proposed pumping in Tule Desert will adversely impact this resource area.

Response to Comment L2-32

See response to comments L2-26 and L2-27. The impacts analysis in the Draft EIS (developed in CH2M HILL, 2002b) assumes that the aquifer is homogeneous and isotropic. Although these conditions are undoubtedly not met within a few tens of feet from a given production well, at the scale of the overall well field analysis in the EIS (i.e., over an area that is approximately three times the size of the Tule Desert [CH2M HILL 2002b, Figure E-1]), the assumption of homogeneous, isotropic conditions is considered reasonable based on the highly fractured nature of the aquifer.

Response to Comment L2-33

On page 4-10 of the DEIS, the reference to the results presented in Las Vegas Valley Water District (1992) are intended to illustrate the point that under the hypothetical situation whereby the well field for the proposed project was located in the Virgin River Valley. In this location, the results of the Las Vegas Valley Water District study concluded that, spatially concentrated pumping 10,000 afy from the Muddy Creek Formation in the vicinity of Halfway Wash indicates that drawdowns on the order of 5 feet extend no more than 6 miles from the pumping center after 50 years. In other words, the well field for the project could be

placed in the Virgin River Valley, as opposed to the more distant Tule Desert, and pump more water (10,000 afy as opposed to 7,000 afy for the project) for a longer period (50 years as opposed to 42 for the project) and still not adversely affect the water level in existing municipal wells in the Virgin River Valley based on the modeling results of the Las Vegas Valley Water District.

The geologic faults described in the comment support the conclusion of the DEIS that ground water flows south from the Tule Desert into the Virgin River Valley.

Response to Comment L2-34

Section 3.4.2.2.4 (page 3-37) of the DEIS concludes based on rationale presented in CH2M HILL (2002b) that there is no significant ground water inflow to the Virgin River downstream of Littlefield Arizona (see also response to comment L2-16). The locations or flow rates of specific springs in the Virgin River downstream of Littlefield are not documented in the known technical literature.

The comment notes that much of the lower [Virgin] river is dry or at very low flow during the summer months. This comment actually supports the argument that there is no direct ground water discharge to the river. As referenced in Section 3.4.2.2.4 (page 3-37) of the DEIS, the comment that ground water in the vicinity of the Virgin River originates in the Tule Desert is not supported by the available water-chemistry data (CH2M HILL, 2002b, Section 4.2.5; CH2M HILL, 2002a).

The EIS neither states nor implies that, "pumping will intercept all the natural ground water discharge and therefore have no impact on the remaining ground water in the basin." The potential water level declines in the Tule Desert are clearly identified in the EIS.

Response to Comment L2-35

The BLM acknowledges that, contrary to the conclusion of the EIS, Katzer et al. (2002) conclude that drawdowns in the range of 100 to 300 feet will occur downgradient in the lower Virgin River Valley. The basis for the disagreement in these conclusions is described in *Section 4.4.1, Ground Water Resources—Incomplete and/or Unavailable Information.*

REVIEW SUMMARY

This review of the document titled "Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement for the Toquop Energy Project" casts serious doubts on the credibility of the authors and their understanding on the hydrology of the lower Virgin River Valley. These flaws may be carried throughout the entire document thus reducing the overall believability of the EIS evaluation and negating many of the conclusions.

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FEB-20-2002 11:51 BUREAU OF LAND MANAGEMENT 775 289 1910 P.17/26

WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENTS COPY
PINK—WELL DRILLER'S COPY

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLERS REPORT

Please complete this form in its entirety

OFFICE USE ONLY
Log No. 45630
Permit No.
Basin 202

OWNER Bruno Biasi ADDRESS Post Office Box 60 Bunkerville, Nevada

2. LOCATION SE ¼ ¼ Sec. 25 T. 13 N/S R. 70 E Clark County
PERMIT NO.

3. TYPE OF WORK		4. PROPOSED USE		5. TYPE WELL	
New Well ☒	Recondition ☐	Domestic ☒	Irrigation ☐ Test ☐	Cable ☐	Rotary ☒
Deepen ☐	Other ☐	Municipal ☐	Industrial ☐ Stock ☐	Other ☐	

6. LITHOLOGIC LOG

Material	Water Bearing	From	To	Thickness
Boulders & loose sand		0	10	10
Hard conglomerate		10	40	30
Red sticky clay, some pea gravel		40	50	10
Red sticky clay		50	70	20
Gravel		70-110		40
Gravel w/ sand		110	130	20
Small grav w/ bldrs		130	150	20
Sm. gray w/ fine sand		150	205	55
Fine sandy clay w/ some pea gravel		205	220	15
Fine sandy clay		220	235	15
ley w/silt & sticky clay		235	250	15
lay w/rough sm. gray.		250	265	15
Sharp rough gray w/ sandy clay		265	280	15
Clay w/small rough gray		280	295	15
Caly w/ sandy silt		295	330	35
Hard clay		330	385	55
Sandy clay		385	430	45
Clay w/sm. houlders		430	450	20
Hard clay w/fine silty sand		450	550	100
Clay		550	805	255

Date started March 1, 19 82
Date completed March 22, 19 82

7. WELL TEST DATA

Pump RPM	G.P.M.	Draw Down	After Hours Pump

BAILER TEST
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours
G.P.M. Draw down feet hours

8. WELL CONSTRUCTION

Diameter hole 12 inches Total depth 805 feet
Casing record
Weight per foot Thickness .250

Diameter	Pipe	To
8 inches	+1 feet	805 feet
inches	feet	335 feet
inches	feet	335 feet
inches	feet	feet
Well backfilled from 335' to bottom	feet	feet

Surface seal: Yes ☒ No ☐ Type Cement
Depth of seal 50 feet
Gravel packed: Yes ☒ No ☐ 335
Gravel packed from 50 feet to 805 feet

Perforations:
Type perforator Mill slots
Size perforator 5/32 x 3" 8 rows
From 115 feet to 235 feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

9. WATER LEVEL

Static water level Feet below land surface
Flow G.P.M.
Water temperature °F. Quality

10. DRILLERS CERTIFICATION

This well was drilled under my supervision and the report is true to the best of my knowledge.

Name THOMPSON DRILLING CO., INC.
4185 West Harmon
Address Las Vegas, Nevada 89103

Nevada contractor's license number 4286A

Nevada driller's license number 582

Signed Richard T. Thompson

Date April 13, 1982

NEL LABORATORIES

CLIENT: Virgin Valley Water District
PROJECT ID: VVWD
PROJECT #: NA

CLIENT ID: Bissi #4
DATE SAMPLED: 1/10/00
NEL SAMPLE ID: L0001081-01

TEST: Inorganic Non-Metals
MATRIX: Drinking Water

PARAMETER	RESULT	REPORTING LIMIT	D.F.	METHOD	UNITS	ANALYZED
Chloride	10	0.5	5	EPA 300.0	mg/L	1/11/00
Fluoride	2.4	0.4	1	SM 4500-F C	mg/L	1/12/00
Nitrate, as N	ND	0.5	5	EPA 300.0	mg/L-N	1/11/00
Nitrite, as N	ND	0.5	5	EPA 300.0	mg/L-N	1/11/00
pH	8.16	2.	1	EPA 150.1	pH Units	1/11/00
pH Temperature	22.8	L	1	EPA 150.1	°C	1/11/00
Sulfate	170	10.	100	EPA 300.0	mg/L	1/17/00
Total Dissolved Solids	414	25.	1	SM 2540 C	mg/L	1/11/00

D.F. - Dilution Factor
ND - Not Detected

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NEL LABORATORIES

CLIENT: Virgin Valley Water District
PROJECT ID: VVWD
PROJECT #: NA

CLIENT ID: Blast #4
DATE SAMPLED: 1/10/00
NEL SAMPLE ID: L0001081-01

TEST: Metals
MATRIX: Drinking Water

ANALYST: JTY - Reno Division

PARAMETER	RESULT mg/L	REPORTING LIMIT	D. F.	METHOD	DIGESTED	ANALYZED
Arsenic	0.0080	0.001 mg/L	1	EPA 200.8	1/13/00	1/16/00
Barium	0.019	0.0025 mg/L	0.5	EPA 200.7	1/13/00	1/14/00
Cadmium	ND	0.002 mg/L	0.5	EPA 200.7	1/13/00	1/14/00
Chromium	ND	0.005 mg/L	0.5	EPA 200.7	1/13/00	1/14/00
Copper	ND	0.002 mg/L	0.5	EPA 200.7	1/13/00	1/14/00
Iron	ND	0.05 mg/L	0.5	EPA 200.7	1/13/00	1/14/00
Lead	ND	0.001 mg/L	1	EPA 200.8	1/13/00	1/16/00
Magnesium	30	0.25 mg/L	0.5	EPA 200.7	1/13/00	1/14/00
Manganese	0.084	0.0025 mg/L	0.5	EPA 200.7	1/13/00	1/14/00
Mercury	ND	0.0002 mg/L	1	EPA 245.1	1/13/00	1/13/00
Selenium	0.0022	0.001 mg/L	1	EPA 200.8	1/13/00	1/16/00
Silver	ND	0.005 mg/L	0.5	EPA 200.7	1/13/00	1/14/00
Zinc	ND	0.05 mg/L	0.5	EPA 200.7	1/13/00	1/14/00

D.F. - Dilution Factor

ND - Not Detected

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Southern Nevada Water Authority

SNWA RESOURCES FAX

Date: August 29, 2002

TO: **Gene A. Kolkman**
Bureau of Land Management
Ely Field Office
FAX: (775) 289-1910

FROM: **Lisa Leptowitz**
SNWA Resources Department
Water Resources Division
Phone: (702) 862-3789
FAX (702) 862-3751

Number of Pages (including cover sheet): 7
If you experience problems with the fax, please call (702) 862-3752

Documents/Comments:

Original hard copy being sent by regular mail

Comments and Responses for Groups and Organizations

Comments and Responses for Groups and Organizations..... 1
Letter - G1. Signatory - Rose Strickland. (The Toiyabe Chapter of the Sierra Club)..... 3
Letter - G2. Signatory - Christopher J. Krupp. (Western Land Exchange Project) 5
Letter - G3. Signatory - Katie Fite. (Committee for Idaho's High Desert) 12

The Toiyabe Chapter of the Sierra Club

Nevada and Eastern California

PO Box 8096, Reno, NV 89507

August 16, 2002

D.M.		
NEPA		
BS		
CAI		
FIRE		
C.F.		

Manager
BLM/Ely F.O.
HC 33, Box 33500
Ely, NV 89301

Dear Manager Kotchman,

On behalf of the Toiyabe Chapter of the Sierra Club, I am submitting comments on the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement for the Toquop Energy Project (draft Toquop amendment/EIS). Many of our over 5,000 members live and recreate near or on public lands in the Ely F.O. area and are concerned about potential environmental impacts of power plant projects and also about losing public lands through disposal actions. This comments are based on a preliminary review of the document and may be expanded later.

The Sierra Club strongly supports the no-action alternative because it is totally inappropriate for power plants in the arid Mojave Desert to use up to 7,000 acre feet of groundwater annually to cool a gas-fired electric power generating plant when other cooling technology is available. We understand that this is the position of the Clark County Commission and are surprised that this is not also the position of the Lincoln County Commission. In addition, the power plant would have unacceptable impacts on the fragile desert environment, including on air quality and on the threatened Desert Tortoise and water-dependent TES species which will be affected by proposed massive groundwater withdrawals.

G1-1

The draft EIS is deficient in identifying and analyzing the environmental impacts of the proposed project as well as in requiring mitigation for those impacts. For example, the project proposal includes paving 14.4 miles of the dirt road presumably to improve access for motor vehicles from the proposed power plant site to Interstate 15. Yet this road goes through the Mormon Mesa Area of Critical Environmental Concern which was established to protect the threatened Desert Tortoise. The EIS analysis, however, finds no significant environmental impacts on Desert Tortoise or its critical habitat of either reconstruction or paving of the road. No data is presented to support this conclusion. No data is presented on increased vehicle usage or speed or estimated mortalities of the threatened species, yet the EIS finds no significant environmental impacts of subsequent use of the paved road by high-speed motor vehicles on Desert Tortoise. The EIS proposes no mitigation for the road impacts on Desert Tortoises.

We assume that the EIS determinations of no significant environmental impacts are based on the Biological Assessment (BA) prepared by the BLM for the US Fish & Wildlife Service in connection with the Toquop amendment/EIS process. Please send us a copy of this BA. What is the status of the Section 7 consultation process with the USFWS on this project? Has a USFWS Biological Opinion (BO) been completed on the project? If not, when is a completed BO expected? Does the BLM intend to finalize the draft Toquop amendment/EIS without a BO issued by the USFWS? We strongly urge the BLM to delay finalizing the EIS until USFWS requirements for protecting Desert Tortoises can be incorporated into the EIS.

Thank you for considering our comments and request.

Sincerely,

Rose Strickland
Conservation Committee

cc: Bob Abbey, State BLM Director

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PO Box 19777
Las Vegas, NV 89119

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Letter - G1. Signatory - Rose Strickland. (The Toiyabe Chapter of the Sierra Club)

Response to Comment G1-1

Section 4.5.1 (Threatened, Endangered, and Sensitive Species) of the DEIS described short-term and long-term and direct and indirect impacts expected on desert tortoises and their habitat as a result of project construction and operation. The number of acres of desert tortoise habitat that would be impacted and the number of tortoises these impacted acres would provide habitat for were discussed in Section 4.5.1. Extensive measures to protect desert tortoise and their habitat apply to the proposed project and were described in detail in *Section 4.5.1.1.2 (Mitigation)* and *Appendix A (Measures for Protecting Desert Tortoises and Their Habitat)* of the DEIS. These measures are an integral part of the Proposed Action and the action alternatives. They include the applicable Terms and Conditions of the Reasonable and Prudent Measures of the U. S. Fish and Wildlife Service's Biological Opinion (BO) for the Approved Caliente Management Framework Plan Amendment and Record of Decision for the Management of Desert Tortoise Habitat that was prepared by the Bureau of Land Management (BLM) in the year 2000.

Specifically for the proposed project, permanent tortoise-proof fencing will be required for the access road from Interstate-15 to the plant to protect desert tortoises and because the access road is within the Mormon Mesa Area of Critical Environmental Concern. All of the information above was clearly stated in the DEIS. Section 4.5.1.1.2 of the DEIS also stated that additional measures to protect desert tortoise beyond those included in the DEIS may be further developed during formal consultation with the FWS under Section 7 of the Endangered Species Act and stipulated in the BO for the proposed Toquop Project. *Section 4.10 (Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers)* of the DEIS discusses impacts on the Mormon Mesa ACEC and its designation as a desert tortoise Special Management Area.

Western Land Exchange Project
P.O. Box 95545 Seattle, WA 98145-2545
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Mr. Gene A. Kolkman, Field Manager
Bureau of Land Management
Ely Field Office
HC 33, Box 33500
Ely, Nevada 89301-9408

August 29, 2002

Dear Mr. Kolkman:

The Western Land Exchange Project is a non-profit, membership organization that monitors federal land trades and conducts research, outreach, and advocacy for reform in federal land exchange law and policy. This letter constitutes our comments on the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement (DEIS) for the Toquop Energy Project.

The Right of Way Alternative

G2-1 The DEIS briefly mentions an alternative to the proposed land exchange that would "keep all public lands needed for the project under BLM management and issue ROWs for the power plant site," DEIS 1-7, but fails to consider it in any detail. Such an alternative is eminently reasonable and must be fully analyzed in the Final EIS.

Purpose and Need

G2-2 The Purpose and Need section misleads the public by declaring a dire public need for the proposed plant because of near- and long-term power shortages in the western United States. DEIS 1-1. In truth, many of the power projects that were hurriedly proposed after the recent California energy "shortage" have been canceled or delayed because of a glut of power on the western market. According to the Public Utilities Commission of Nevada, six proposed generation plants in Nevada alone have been postponed. See http://www.puc.state.nv.us/ELECTRIC/proppgen.pdf

G2-3 While the DEIS claims that the proposed project would contribute to meeting the demand for power in the Las Vegas area . . . (and) the Arizona-New Mexico-southern Nevada power area," it notably does not mention whether the City of Mesquite or Lincoln County would be served by the project. The DEIS also fails to mention whether local or regional electric utilities would be guaranteed first rights to purchase Toquop Energy power or instead the power would simply be placed on the Western grid for sale to the highest bidder. These issues must be addressed in the Final EIS, or the agency will have failed to demonstrate a purpose and need for the power plant.

G2-4 The DEIS also overstates the purpose and need for the land exchange. The proposed exchange would acquire a square mile parcel within 1.5 miles of I-80, DEIS 3-61, that is "typical of other relatively undisturbed habitats at similar elevations in the surrounding area." DEIS 3-54. The parcel "supports a fairly monotypic vegetation community," DEIS 3-53, and contains no wetlands, other aquatic areas or riparian vegetation, DEIS 3-55. The Pah Rah land would provide an insignificant amount of sage grouse habitat and negligible improvements in management efficiency. The final EIS must include a map of the Reno

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Letter - G2. Signatory - Christopher J. Krupp. (Western Land Exchange Project)

Response to Comment G2-1

All of the action alternatives described in Chapter 2 of the DEIS allowed for either the completion of a land exchange or issuance of a right of way for the Toquop Power Plant site. The impact analysis sections (Chapter 4) discuss in detail where a difference in impacts would result if a right-of-way were issued. The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* identifies disposal through sale or exchange. For example, in the FEIS, Section 4.16.5, *Tax Receipts if No Land Exchange Were to Occur under the Proposed Action, Alternative 1, Alternative 2, or Alternative 3* specifically addresses the two options. Section 4.16.5 and Appendix B, *Standard Construction and Operation Procedures*, of the of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* describe the differences in liability between right-of-way administration and transfer to private ownership.

Response to Comment G2-2

The Purpose and Need Statement (Sections 1.2 and 1.3) quantifies the project's contribution to overall power demand for the Las Vegas area and the Arizona-New Mexico-Southern Nevada power area.

Response to Comment G2-3

See response to Comment L2-4.

Response to Comment G2-4

See response to Comment G3-3.

G2-4 area that shows public and private land ownership patterns -- the map will reveal just how inconsequential this exchange would be in terms of land management efficiencies. Further, during scoping we specifically requested that the DEIS identify the factors that make the offered parcel, of all the private inholdings in the Pah Rah Mountains, especially susceptible to communications site development. The DEIS provides little or no evidence of any th reat of development to the NLRC-offered parcel and generally does not demonstrate the purpose and need for the proposed land trade.

G2-5

Future Use of Selected Land Not Needed for Power Plant

G2-6 Toquop Energy would require only 100 of the 640 acres that NLRC would acquire through the proposed land exchange. DEIS 2-18. The Final EIS must identify the future use of the remaining 540 acres and whether NLRC or Toquop Energy would own the land.

Coyote Springs Land Exchange

G2-7 The DEIS fails to analyze all interrelated projects. The proposed Coyote Springs Land Exchange, which would transfer up to 14,000 acres of BLM-managed lands approximately 35 miles west of the proposed power plant to an investor seeking to develop up to 50,000 homes on the property, was not identified as an interrelated project likely to have cumulative impacts. The Final EIS should analyze the cumulative impacts likely to result from the Coyote Springs Land Exchange and subsequent development.

Vidler Water Company/Lincoln County Application for Water Rights in Tule Desert

G2-8 In the discussion of the wellfield that would supply the proposed project with cooling water, the DEIS notes that Vidler Water Company and Lincoln County have jointly applied for the required water rights. The Final EIS should discuss the Nevada Attorney General's opinion that the Vidler/Lincoln County relationship violates Nevada law. It should also acknowledge that the Division of Water Resources of the State of Nevada Department of Conservation and Natural Resources has established a perennial yield of 1,000 acre-feet for the Tule Desert Hydrographic Basin. See Glancy, P.A., and Van Denburgh, A.S., 1969, Water-resources Appraisal of the Lower Virgin River Valley Area, Nevada, Arizona and Utah: Nevada Department of Conservation and Natural Resources, Water Resources Reconnaissance Series Report 51. The final EIS must address how the proposed project would be affected if the Nevada State Water Engineer were to reject the joint application to withdraw seven times the perennial yield of the Tule Desert basin. If the application were rejected, Toquop Energy would need to find an alternative source of 7,000 acre-feet of cooling water per year, not a simple proposition in Nevada. BLM must also explain why it is analyzing a proposal that the State of Nevada has concluded would violate its laws.

G2-9 Several studies contradict the DEIS' conclusion that the lower Virgin River does not receive inflow from ground water. See Dixon, G.L. and Katzer, T., 2002, Geology and Hydrology of the Lower Virgin River Valley in Nevada, Arizona and Utah: Virgin Valley Water District, Mesquite, Nevada, Report No. VVWD-01; Glancy and Van Denburgh, 1969; Brothers, K., Katzer, T., Mojib, R.M., Grinnell, G., Bernholtz, A., and Johnson, M., 1993, Addendum to Hydrology and Interactive Computer Modeling of Ground and Surface Water in the Lower Virgin River Valley, Primarily in Clark County, Nevada: Las Vegas Valley Water District, Cooperative Water Project, Series Report No. 1-A. The Final EIS must address these studies and justify BLM's contrary position.

G2-10 The DEIS states that the large amount of ground water in storage in the Virgin River Valley would mitigate any impacts to the Virgin River of pumping 7,000 acre-feet/year for Toquop Energy cooling. DEIS 4-9. Given this position, the Final EIS must consider the cumulative impacts that would result if the Southern Nevada Water Authority and the Virgin Valley Water District's existing applications for more than 260,000 acre-feet/year of water in the Virgin River Valley were granted.

Range Of Alternatives

G2-11 The Final EIS must fully consider a broader range of alternatives than the DEIS has provided. It is spurious to claim that other alternatives were initially considered but

Response to Comment G2-10

Section 4.4.1.1.1 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* demonstrates that there will be no substantial decline in ground water levels or a substantial depletion of ground water resources in the Virgin River Valley. Consequently, the project will not contribute to cumulative impacts to the Virgin River Valley that would result if the Southern Nevada Water Authority and the Virgin River Water District existing applications for more than 260,000 acre-feet per year of water in the Virgin River Valley were granted.

Response to Comment G2-11

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

Response to Comment G2-5

If the land is exchanged, the Pah Rah parcel will be managed for multiple use.

Response to Comment G2-6

If the exchange takes place, Toquop Energy would acquire all 640 acres of the Toquop Parcel from NLRC. One-hundred acres would be used for the power plant and the remaining 540 acres of land would remain in Toquop Energy ownership. While there is potential for other industrial uses, there are no plans at this time for new uses of those lands.

Response to Comment G2-7

The Coyote Springs development has been included in the list of interrelated projects in Section 1.8 and cumulative impacts have been analyzed in *Section 4.18, Cumulative Impacts,* of the of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project.*

Response to Comment G2-8

See response to Comment L2-1.

Response to Comment G2-9

Section 4.4.1, Ground Water Resources— Incomplete and/or Unavailable Information of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* addresses incomplete and/or unavailable information.

ultimately rejected from further consideration because they were infeasible. The only reason other alternatives were deemed infeasible is because NLRC was unwilling to consider them. A glaring example of this is the BLM's failure to consider alternative cooling systems for the proposed power plant because air-cooling would require approximately one-tenth the water of water-cooling and eliminate a substantial profit source for NLRC's sister company, Vidler Water Company.

The DEIS asserts that an air-cooled system was ultimately not considered because, among other things, "[t]he use of an air-cooled system would result in increased capital and operations costs and make the project unable to fulfill the requirement set out in the Purpose and Need that the proposed action generate power at competitive rates to the consumer," and "[t]he increased capital and operation cost associated with the air-cooled option would result in making the project non-competitive in the regional wholesale electric marketplace, thus making the project economically unfeasible." DEIS 2-40. Other proposed power projects in southern Nevada put the lie to these claims. Duke Energy's Moapa Energy Facility, Mirant Corporation's Apex Generating Station, Pinnacle West Energy's Silver Hawk Power, Diamond Generating's Ivanpah Energy Center and Reliant Energy's Bighorn and Arrow Canyon projects are all examples of air-cooled power generating facilities proposed for southern Nevada. If those projects are feasible, so too is an air-cooled facility for Toquop Energy and the Final EIS must consider such an alternative.

G2-11

Environmental Impacts

When determining the environmental consequences of the proposed power project, the DEIS should not have assumed that the design of the Tule Desert wellfield and associated pipelines would only have sufficient capacity to supply the Toquop Energy Project. Vidler Water Company and Lincoln County have previously proposed that the Tule Desert Hydrographic Area and accompanying pipelines supply water to the 13,500-acre development resulting from the Lincoln County Land Act of 2000 (LCLA). In fact, one of the applications identified in the DEIS as a source of water for the power facility (No. 64693), specifically identifies LCLA lands, as well as Toquop Energy, as a place of use. The agency cannot avoid cumulative impact analysis by relying on false assumptions.

G2-12

The BLM continues to artificially isolate the groundwater impacts of each project and avoid any analysis of the cumulative groundwater impacts from the numerous projects proposed for the area. While the DEIS acknowledges that development resulting from the Mesquite Lands Act (MLA) and LCLA will likely have a considerable associated water demand, "DEIS 4-11, it claims there is insufficient information regarding specific demand and potential sources for water to assess potential cumulative impacts. DEIS 4-11. This is the same type of claim the BLM made in the environmental assessment (EA) for the first phase of the LCLA. In that document, the BLM estimated the eventual water demand for the first phase of LCLA development at more than 21,000 acre-feet per year, and asserted that the water would come from the Tule Desert or Kane Springs Valley Hydrographic Areas. Given that information, there is no reason that the DEIS could not assess the cumulative groundwater impacts of LCLA development.

G2-13

The assessment of the impacts to threatened and endangered species is inadequate. There is significant controversy regarding the hydrologic relationship between Tule Desert groundwater and the Virgin River. Given the controversy, the BLM was obligated to analyze impacts to the Southwestern willow flycatcher, Yuma clapper rail, woundfin, and Virgin River chub if 7,000 acre-feet of groundwater were annually withdrawn from below the Tule Desert and Virgin River flows were linked to that groundwater. Further, while the DEIS admits that for the desert tortoise an "ongoing potential exists for added incremental impacts from all projects that could have long-term effects," DEIS 4-16, it makes no effort to qualify or quantify those effects. The proposed project must be subject to the Southeastern Lincoln County Multi-Species Habitat Conservation Plan (HCP), despite the fact that project permitting would be completed prior to HCP implementation. The HCP is largely meaningless if other projects are held to it but construction and operation of the power plant are not.

G2-14

Response to Comment G2-12

The action as proposed is that the wellfield and water pipeline would only be capable of providing water for the proposed power plant. If approved through the NEPA process, this is in fact what will occur. Any additional use of this pipeline and the required increase in size would require separate BLM and NEPA analysis.

Response to Comment G2-13

See response to Comment G7-9.

Response to Comment G2-14

One of the objectives of the water resources analysis was to determine whether or not the proposed project would affect the Virgin River, and subsequently its biological resources. Extensive ground water hydrologic investigations that included field studies and analytical modeling were conducted by professional hydrologists to address this issue. Particular emphasis was placed on conducting very rigorous hydrologic investigations for a number of reasons, including that stated in this comment (i.e., because of past controversy surrounding the hydrologic relationship between

Tule Desert ground water and the Virgin River). Water resources study results were critically reviewed by agency specialists and representatives expert in this field prior to the incorporation of study findings into the DEIS. Results of these studies indicate that the proposed project would not adversely affect the Virgin River, its aquatic and riparian habitat, or biota associated with these Virgin River habitat types. Results of ground water studies and conclusions are discussed extensively in Section 4.4 of the DEIS (Section 4.4.1.4 of the DEIS specifically concludes that flow in the Virgin River would not be affected by the proposed project). Based on this finding, Section 4.5.1 of the DEIS concludes that the proposed project would not directly or indirectly impact aquatic or riparian habitats of the Virgin River used by Southwestern willow flycatcher, Yuma clapper rail, woundfin, and Virgin River chub.

Regarding desert tortoises, please see the responses to comments F1-5 and G1-1 regarding the qualitative and quantitative descriptions of impacts and cumulative impacts on desert tortoises. In addition, *Section 4.5.1.1.2 (Mitigation)* of the DEIS notes that measures for protecting desert tortoises described in Appendix A of the DEIS are consistent with measures contained in area Habitat Conservation Plans.

Section 4.1.2 of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* addresses incomplete and/or unavailable information.

G2-15 The discussion of cumulative impacts on air quality must include analysis of the effects of the buildout of LCLA and MLA lands. The air-quality impacts caused by approximately 200,000 new residents living less than fifteen miles from the proposed power plant are significant and must be considered.

Future of Land Exchange if Power Plant is Cancelled

G2-16 The DEIS did not mention Aquila Corporation's plans to acquire Cogentrix, the would-be owner and operator of Toquop Energy. In the past year, Aquila has lost more than 90 percent of its stock value in the face of intense scrutiny of its Enron-like energy trading business and accounting practices. Considering Aquila's financial difficulties, the glutted energy market, and delays and scale-backs with other Nevada power plants, the Final EIS should address whether the land exchange would be completed if Aquila/Cogentrix were to cancel its Toquop Energy plans. If the Toquop Plant were canceled the land exchange must also be canceled, because the agency has shown no discernible public benefit in creating a private inholding among public lands in southeastern Nevada to eliminate one of hundreds of private inholdings in northwestern Nevada.

Thank you for the opportunity to comment.

Sincerely,

Christopher J. Krupp
Staff Attorney

Response to Comment G2-15

Section 4.18, Cumulative Impacts of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* analyzes the effects of the Mesquite Land Act and the Lincoln County Land Act disposal areas.

Response to Comment G2-16

These are independent decisions. One of the actions could proceed without the other action proceeding.

COMMITTEE FOR IDAHO'S
HIGH DESERT
P.O. BOX 2863 BOISE, IDAHO 83701
208-429-1679 www.cihd.org

July 29, 2002

BLM
Ely Field Office
Gene Kolkman
HC 33, Box 33500
Ely, NV 89301-9408

JUL 2002
RECEIVED
Bureau of Land Management
Ely, Nevada

Dear Mr. Kolkman,

Here are the comments of the Committee for Idaho's High Desert and Western Watersheds Project on the Draft Toquop Land Disposal Amendment and DEIS for the Toquop Energy Project.

G3-1 We are deeply concerned about the failure of BLM to adequately consider cumulative impacts of the many developments, land disposal actions and power developments that are occurring in this area. We are also deeply concerned about the impacts to water supplies and aquifers in the region.

What are the cumulative impacts of all the various new developments to water supplies? Desert tortoise habitats? Cultural sites? Recreational uses of the affected lands? What are the cumulative impacts to desert tortoise of various developments and increased human activities associated with the power plant?

G3-2 BLM has failed to adequately identify and quantify water volumes available from possible water sources from this project.

Pumping from an underground aquifer may rapidly deplete the water source. How much volume of water is present in the aquifer? What is the recharge rate? What is the source of the aquifer's water?

What is the relation between Vidler and Sierra Pacific? In these days of corporate roguery and deception, the public deserves to know if there is any connection between the two entities.

G3-3 Pah Rah parcel: We are concerned that BLM is simply acting out the bidding of a private corporation seeking to profit from wheeling and dealing in disposal and trading of public lands. Why is there no alternative parcel of land being proposed for trade? The PahRah parcel is described as "desirable". What data does BLM have to support this?

Role of Vidler. What exactly is the role of Vidler water here?

ES-5 describes a "distribution line" to a wellfield along the 12.5 mile-long western water pipeline ROW.

G3-4 Why has an alternative site along the existing corridor not been evaluated for location of the power plant?

Letter - G3. Signatory - Katie Fite. (Committee for Idaho's High Desert)

Response to Comment G3-1

Section 4.18, Cumulative Impacts, of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* further addresses the cumulative impacts of interrelated projects.

Response to Comment G3-2

Section 3.4.2.1.1 (page 3-25) of the DEIS provided an estimate by the Nevada Department of Water Resources of approximately 530,000 acre-feet of ground water in storage in the basin-fill deposits of the Tule Desert. Additionally, page 3-31 in Section 3.4.2.1.2 provides an estimate of approximately 400,000 acre-feet in storage within the fractured-rock aquifer in the Tule Desert. The amount of recharge to the Tule Desert has been estimated by Walker (2002) to be approximately 8,968 acre-feet per year (Katzer et al., 2002).

Pages 3-29 and 3-30 in Section 3.4.2.1.2 of the DEIS presented a discussion of the general origin of the ground water in the fractured-rock

aquifer of the Tule Desert based on water chemistry data. Section 4.4.1.1.1 (pages 4-9 and 4-10) of the DEIS presented the results of six separate analyses to support the conclusion that project pumping would not result in either substantial groundwater level declines or a substantial depletion of the groundwater resource within the Virgin River Valley.

Response to Comment G3-3

See Section 2.2.2.2, Section 3.9.2.1, and Map 3-13 in the DEIS regarding BLM's reasons for acquiring this parcel. BLM's current land use plans provide for this acquisition. Acquiring this parcel will provide the resources identified in the DEIS by eliminating another portion of the "checker board" land and by "blocking in" more of the area as shown on the map.

Response to Comment G3-4

Section 2.7.2, Alternative Locations, of the *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* clarifies that the Proposed Action power plant site is the only site located in Lincoln County outside of critical desert tortoise habitat, with access to both electric and gas transmission facilities, and with existing road access.

G3-5 BLM has failed to evaluate a reasonable range of alternatives. Why has the alternative of an air-cooled power plant not been fully evaluated? Air-cooled power plants use only a fraction of the water that water-cooled plants do. What are the differences in water volume between an air-cooled and water-cooled plant?

G3-6 Why has a plant location in or near the Las Vegas area not been evaluated as an alternative? There are many existing power lines there, and far less power would be lost if it was generated closer to the site of use. Please quantify this.

G3-7 Are any other projects planning to tap into the wells in the Tule Desert? If so, what are these projects?

G3-8 We are very concerned at BLM's hasty and preliminary conclusion (ES-13) that "no adverse effects on ground water resources would occur". BLM has failed to present adequate data that: no lowering of the ground water levels in wells will occur, no regional aquifer depletion will occur, no ground water quality degradation will occur, and no change in Virgin River flow will occur.

ES-13 states that 236 acres of desert tortoise habitat will be disturbed.

G3-9 Mitigation: We believe BLM has failed to require adequate mitigation.

Please keep us fully informed of all parts of this project.

Sincerely,

Katie Fite
Committee for Idaho's High Desert
PO Box 2863
Boise, ID 83701
208-429-1679

Response to Comment G3-5

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

Response to Comment G3-6

Please see the response to Comment G3-4.

Response to Comment G3-7

No plans exist for the use of water from the wells installed for this project by other projects.

Response to Comment G3-8

The statements related to potential impacts to ground water resources in the Executive Summary of the DEIS summarize the extensive analyses and findings presented in Section 4.4.1 (beginning on page 4-7). Section 4.4.1.1.1 (pages 4-9 and 4-10) of the DEIS presented the results of six separate analyses to support the

conclusion that project pumping would not result in either substantial groundwater level declines or a substantial depletion of the groundwater resource within the Virgin River Valley.

Response to Comment G3-9

Consistent with CEQ, many protective, precautionary measures would be implemented as a part of the Proposed Action to prevent, reduce, or minimize the occurrence of adverse project-related impacts. These measures were described in detail in the DEIS in *Appendix A (Measures for Protecting Desert Tortoises and Their Habitat), Appendix B (Standard Construction and Operating Procedures),* and *Appendix C (Cultural Resources Programmatic Agreement).* All of these measures would be implemented as an integral part of the Proposed Action or one of the action alternatives. Where potential impacts on a particular resource are anticipated to occur despite the measures listed in Appendices A, B, and C, mitigation measures were described in Chapter 4 of the DEIS. Table ES-2 in the Executive Summary of the DEIS summarized the best management practices (BMPs), standard operating procedures (SOPs), and mitigation that would be implemented for the various resource areas.

Comments and Responses for Citizens

Comments and Responses for Citizens **1**
Letter - C1. Signatory - John F. Link 3
Letter - C2. Signatory - Shirley Taylor 4
Letter - C3. Signatory - Robert Nard 5
Letter - C4. Signatory - John M. Torok 6
Letter - C5. Signatory - John I. Sutherland 7
Letter - C6. Signatory - Charles E. Hancock 8
Letter - C7. Signatory - Don Oliver 11

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BUREAU OF LAND MGMT
ELY, NEVADA
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June 29, 2002

Bureau of Land Management
Gene A. Kolkman, Field Manager
Ely Field Office
HC 33, Box 33500
Ely, Nevada 89301-9408

RE: NEVADA LAND & RESOURCES COMPANY, LLC LAND SWAP

Dear Mr. Kolkman:

After reading an article in the Reno-Gazette Journal dated June 18, 2002, and the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement for the Toquop Energy Project regarding Nevada Land & Resources Company, LLC's (NLRC) land swap in the Pah Rah Range east of Reno in Washoe County for land in the Toquop Wash area I feel that this proposed swap is a blatant rip off of the taxpayer

The land owned by NLRC in Section 9, Township 20 North, Range 23 East in Washoe County is in a very remote portion of the Pah Rah Range that has little, if any, commercial value because there is very little chance of developing water, and it has very poor access and can therefore only be considered as non-developable

C1-1

The land in the area of Toquop Wash area, however, is alongside an existing electrical transmission line and an existing natural gas line and is on reasonably developable ground, and the many springs in the area suggest that there is adequate subsurface water available for the building of the proposed electric power generation plant.

How could anyone in their right mind consider trading on an acre for acre basis for such land? A more equitable trade for the benefit of the taxpayer would be if Nevada Land & Resources Company, LLC were to trade all of their railroad grant land sections that they own in the Pah Rah Range for the section of land at Toquop Wash.

There is absolutely no comparison in the value and potential value of the land in the Pah Rah area and that in the Toquop Wash area and this swap should not be allowed to proceed

Sincerely,

John F. Link

Letter - C1. Signatory - John F. Link.

Response to Comment C1-1

Comment noted.

0 7/10/02

Provide Your Comments

We would like you to provide comments on the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement for the Toquop Energy Project. Please use this form to express your opinions. You may complete and return this form before leaving the meeting, or you may complete the form later and mail it to:

GENE A. KOLKMAN, FIELD MANAGER
U.S. BUREAU OF LAND MANAGEMENT
ELY FIELD OFFICE
HC 33, Box 33500
ELY, NV 89301-9408

The comment period ends August 29, 2002. Thank you for your participation.

PLEASE PRINT

Name: SHIRLEY TAYLOR

Address: 1221 WILLIAM ST MESQUITE

My comments are as follows (if needed, attach additional pages):

C2-1 I AM STILL CONCERNED ABOUT THE WATER ASPECT I KEEP SAYING "IT'S RUBBING PETE TO PAY PAUL".

Letter - C2. Signatory - Shirley Taylor.

Response to Comment C2-1

Comment noted.

Ivollegas 7/9/02

Provide Your Comments

We would like you to provide comments on the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement for the Toquop Energy Project. Please use this form to express your opinions. You may complete and return this form before leaving the meeting, or you may complete the form later and mail it to:

GENE A. KOLKMAN, FIELD MANAGER
U.S. BUREAU OF LAND MANAGEMENT
ELY FIELD OFFICE
HC 33, BOX 33500
ELY, NV 89301-9408

The comment period ends August 29, 2002. Thank you for your participation

PLEASE PRINT

Name: ROBERT NARD

Address: 1701 Whitney Mesa Drive, Suite 101, Henderson NV 89014

My comments are as follows (if needed, attach additional pages):

C3-1 BY USING CONVENTIONAL COOLING TOWER OVER AN AIR Cooled Condenser APPROX. 2000 ACRE FEET more water is needed per 500 MWH of Power = 4000 Acre Ft/Year Excessive water use is major concern. We need to conserve water in this state at all costs.

C3-2 Also, A Project Labor Agreement should be used on the project with the So NV Building Construction TRADES Council to be affiliated with Local LABOR, Highly Skilled, Safety etc.

Letter - C3. Signatory - Robert Nard.

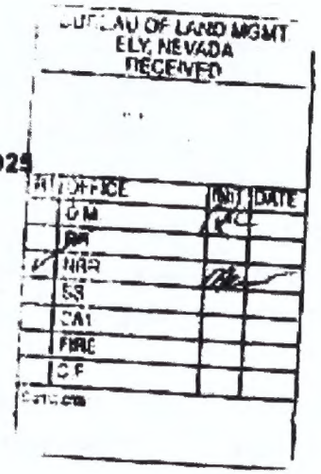
Response to Comment C3-1

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

Response to Comment C3-2

Comment noted.

JOHN M. TOROK
P. O. Box 2302
Reno, Nevada 89505-2302
Tel: (775) 851-2899 Fax: (775) 851-4025



June 28, 2002

Bureau of Land Management
Ely Field Office
Gene A. Kolkman, Field Manager
HC 33, Box 33500
Ely, Nevada 89301-9408

Dear Mr. Kolkman

C4-1

The idea that Nevada Land & Resources Company, LLC's land in the Pah Rah Range east of Reno in Washoe County is equal in value to that in the Garden or Toquop Wash areas is shows pure foolishness on the part of the Bureau of Land Management staffs in both the Carson City District and the Ely District if the BLM actually believe this.

Section 9, Township 20 North, Range 23 East in Washoe County is in a remote portion of the Pah Rah Range that has little or no commercial value, no or very little chance of developing any water, has very poor access and can only be considered as non-developable.

The land in the area of Toquop Wash sets alongside an existing natural gas line and existing electric transmission line, is on reasonably level developable ground, and with many springs in the area suggests that the is adequate subsurface water available for the building of the proposed electric power generation plant.

How could anyone in the right mind consider trading and acre for acre basis for such land. A more fair trade for the benefit of the United States Taxpayers would be if Nevada Land & Resources Company, LLC were trade all of the railroad grant land sections they own in the Pah Rah Range for the section of land at Toquop Wash

There is just simply no comparison of the value of the non-developable land in the Pah Rah Range and that at Toquop Wash where subsurface water is available, and there is existing power and natural gas lines.

Sincerely,

John M Torok

Letter - C4. Signatory - John M. Torok.

Response to Comment C4-1

Comment noted.

6/5/02
Dave

June 1, 2002
Ref #N-74105

Dear Mr Pope,
Subject: Proposed Pub [illegible] Exchange N-74105

C5-1

We strongly support the land exchange proposed in N-74105. The high cost of electricity in southern Nevada for fixed income retirees like ourselves is becoming quite a financial burden. It is our recommendation that the USDI, BLM do everything possible to facilitate this exchange

The opposition by the Fish and Game and the American Indians should be disregarded for the betterment of all Southern Nevada residents

Sincerely, John I Sutherland, rtd
Joyce Sutherland, rtd

John I Sutherland
PO Box 2015
Mesquite, NV 89024-2015
702-346-2239

Letter - C5. Signatory - John I. Sutherland.

Response to Comment C5-1

Comment noted.

CHARLES E. HANCOCK
2130 PINE RIDGE DRIVE
RENO, NEVADA 89509

X
NR
Jo

Dave

RECEIVED
2002 JUN 11 P 12:11
CARSON CITY FIELD OFFICE

John Singlaub, Manager
Carson City Field Office, Blm
5665 Morgan Mill Rd.
Carson City, Nv 89701

6/15/02

Ref. N-74105-NOEP

Dear mr. Singlaub,

C6-1

This is in responce to your Notice of Exchange Proposal N-74105. Following are my comments and concerns on the appraisal of the offered land.

The supplemental appraisal report is a continuation of a series of appraisal reports prepared by Mr. Norberg, MAI covering offered lands being used by Blm land exchange proponents. My major concern deals with the Treatment of the access problem on the offered isolated checkerboard section in this exchange. I had the same concern in the Wingfield Springs and Wade-Fernley land exchanges. However the IBLA determined that I did not have standing and did not have to consider the merits of my appeal.

Access to any parcel being appraised is a key element in the valuation process. Access falls into two categories, Legal and physical

Letter - C6. Signatory - Charles E. Hancock.

Response to Comment C6-1

Comment noted.

appraisers generally discuss this item under the site analysis in the Property Data section of the appraisal report. It is a key item in the comparison analysis.

The appraiser must analyze the difference in access between the comparables and subject that are recognized and would be considered by Typical buyers and sellers of the subject property. The preferred method of developing an access adjustment is by comparing sales with similar and dissimilar access. A "cost to cure" may also be an appropriate measure of the extent of the difference and should be used where there is a serious problem regarding legal access.

The appraiser for the subject parcel covered both physical and legal access in his report. However, his discussion on access to this section of land raised more questions than it answered on legal access. His discussion on access does not lead me to believe there exists legal access to this parcel. He specifically says there does not appear to be any available access whatsoever to parcel 7 (subject) nor did he document that there is legal access. He does say the status of legal access is not easily determined or documented. There may well be prescriptive rights to the subject parcel if so pursued in the courts by the owner, but the cost would be prohibitive, with little assurance of success.

My concern is that, without legal access and no physical access, what does an informed buyer really have? Any knowledgable buyer of this type of property knowing of a physical and legal access problem would insist that the appraised value would reflect the "cost to cure" of these problems and that it would be reflected in the comparable sales analysis.

Federal right-of-way regulations could also be a major factor in obtaining legal access to the subject parcel. This portion of the Pah Rah range is checkerboard landand would require Blm to issue R/W's for access. The Southern Washoe County Urban Interface Plan which covers this parcel, indicates that ORV use in the Pah Rahs will be limited to existing roads and trails. This designation would not preclude BLM issuing R/W's through its lands, but it would be difficult and very expensive. costs would include but not be limited to, preparation of EA's, cultural resource studies, mineral evaluations, engineering plans, etc.

Acceptance of this value by Blm without clarification and further analysis of the access problem could result in Blm's paying more for this land than a prudent typical buyer would pay.

The value appraised for this parcel are too high if there is a physical and legal access problem on this property.

C6-1

BUREAU OF LAND MGT.
ELY, NEVADA
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Comments:

July/August 2002

Bureau of Land Management
Ely Field Office
Gene A. Kolkman, Field Manager
HC 33, Box 33500
Ely, Nevada 89301-9408

To Whom It May Concern:

C7-1 I would like to express my concerns over the Toquop Energy Project located approximately twelve (12) miles northwest of Mesquite. I understand a cooling tower will be used, which will result in a waste of our valuable water supply. The labor used will be out of state, therefore denying the

C7-2 residents of Nevada , a chance for employment. Finally, after using and wasting our water supply, denying our residents a chance of employment, the profits will be sent out of state.

C7-3 My recommendation for a solution, would be to use an air cooled condenser and the labor issue could be resolved by negotiating a one time Project Labor Agreement with Southern Nevada Building and Construction Trades Council. I feel a Project Labor Agreement would benefit the State of Nevada and the residents of Nevada in all aspects.

Sincerely,

Don Oliver

Letter - C7. Signatory - Don Oliver.

Response to Comment C7-1

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

Response to Comment C7-2

Comment noted.

Response to Comment C7-3

The *Proposed Toquop Land Disposal Amendment to the Caliente MFP and FEIS for the Toquop Energy Project* presents a detailed analysis of an air-cooled alternative (Alternative 3).

NOTE:
The BLM received 141 copies of this letter sent by different parties. A list of the parties who sent this letter is provided in Chapter 5, *Consultation and Coordination*, of the FEIS.